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VOL. VIII

MAY, 1937

No. 2

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Study of Organic Efficiency of U. S. Veterans at the Domiciliary Facility, Bay Pines, Florida

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INTRODUCTION

THIS study was made possible through the invitation of the Medical Director of the U. S. Veterans' Administration, Charles M. Griffith, and the cooperation of both Colonel M. Bryson, Manager, and Colonel T. S. Troy, Chief Medical Officer. Major J. R. Waltman and Captain J. Cronin aided in securing the veterans for examinations.

This research includes 236 U. S. Veterans under domiciliary care. One hundred and ninety-six men took the full Organic Efficiency Test, and 40 men took a partial test due to various physical handicaps.

The examinations were all taken at Bay Pines, Florida, by McCurdy during January, February, and March 1936. The statistical work has been done by Larson.

PURPOSES IN THE SERIES OF STUDIES

These researches cover the college age (18-24), the soldier age (21-35), the veterans' age (35-50) and the civilian group (over 50).

1. To supplement objectively the clinical medical examination.
2. To furnish a predictive index of organic capacity at the various age levels.
3. To indicate the general amount and limitations in the type of work or recreation advisable for men at each age level.
4. To determine the decreases in organic efficiency due to age, e.g., comparison of soldiers with veterans.
5. To find the effects of vigorous work on the organic efficiency, e.g., soldiers.

LIMITATIONS OF STUDY

1. It does not indicate structural changes for which there is full compensation, e.g., vital regurgitation.
2. The test does not measure mechanical ability, e.g., body mechanics in arthritis cases.
3. The test does not measure the variety of neuro-muscular skills:
 - a) in arthritic cases due to loss of function
 - b) in people lacking in previous skill education
 - c) in loss of skill in older people due to age or lack of practice.
4. The test does not give an index of intellectual efficiency aside from clinical observations related to ability to follow directions, e.g., in stair climbing, the rate and directions of turns.
5. The test does not measure social efficiency, i.e., the ability to live in organized society.

USES OF ORGANIC EFFICIENCY INDEX

The Organic Efficiency Test attempts to measure physiological fitness or attempts to predict present organic efficiency (cardio-vascular, respiratory, exercise tolerance to a standard exercise, as stair climbing of Prudential Life Insurance Company).

CRITERIA FOR CARDIO-VASCULAR EFFICIENCY EVALUATION
OF U. S. VETERANS

We have compared the United States veterans with groups of people who are known to represent a certain part of the physiological curve. We have selected a group of people who represent the upper range on this curve to serve as the criteria. After the selection of our criteria for the evaluation of organic efficiency for the veterans our problem was to find a cardio-vascular test that would be a valid measure of cardio-vascular efficiency as found in these groups. We have selected for comparison six cardio-vascular tests that have been used by various people for cardio-vascular efficiency classification.

The criteria which we have selected for cardio-vascular efficiency evaluation of the veterans are as follows:

1. *Springfield College Varsity Swimmers.*—This group represents a total of sixty men who were in mid-season condition in their training when examined. All these men were able to swim 440 yards in varsity time, i.e., all the swimmers who did not have the endurance and skill necessary for successfully swimming this distance were eliminated. The group represents the upper range on the physiological curve.

2. *Springfield College Freshmen.*—The freshman classes for years 1934-35 and 1935-36 will be used as the second group criterion for organic efficiency evaluation of the U. S. veterans. This group of people

represents the middle and upper range on the physiological curve. The total number of men in this group is 318.

3. *Springfield College Track and Cross-Country Men.*—This is a group of twenty-nine men, twenty of whom were track men, and nine cross-country men. The track men were examined previous to running 440 yards, while the cross-country men were examined each week for the 1935 (fall) season. The scores used for the cross-country men were those secured after they had reached the mid-season peak in training. This group represents the upper portion of the range on the physiological curve.

STATISTICAL METHOD AND PHYSIOLOGICAL INTERPRETATION OF RESULTS

The veterans have been arranged into three groups for statistical analysis. First, the total number of men examined by use of the Organic Efficiency Test and five other cardio-vascular tests. We will call this group the "total" group for sake of simplicity. This total group was divided into two groups according to the entrance medical examination and previous health record. The first group included those with minimum organic defects or defects which would not necessarily affect the organic functional condition of the men. This group will be called "Minimum Defects" group and will represent the second group of U. S. veterans. The remaining men of the total group were those with maximum organic defects, or defects which would definitely affect the organic condition of the men. This group will represent the third group of veterans in this analysis and will be called the "Maximum Defects" group. The "Total" group contain 196 veterans, while the "Minimum Defects" group and "Maximum Defects" group have 56 and 140 men each. These groups of veterans are men who do not have full capacity for work or are organically inefficient. These people represent the lower range on the physiological curve.

The criteria which we have selected represent people who are organically efficient as represented by strenuous activity, such as, swimming 440 yards at top speed (swimmers), running one mile to five miles in varsity time (cross-country and track). The freshman group are men who are put through a very strenuous program of physical activity. It is evident by this capacity for work that they represent groups in the middle and upper range on the curve. The criteria are three and will be labeled as follows whenever referred to in this analysis (1) College Varsity Swimmers, as "Swimmers," (2) Springfield College Freshmen, as "Freshmen," and (3) Springfield College Track and Cross-Country men, as "Track."

A valid test of cardio-vascular efficiency would classify these groups into their proper placement on the physiological efficiency curve. Six cardio-vascular tests were used in examining these veterans in order to

find the most valid test for cardio-vascular efficiency. These tests are McCloy's Two Variable Cardio-Vascular Test, Barach's Cardio-Vascular Test, Stone's Cardio-Vascular Test, Tigerstedt's Cardio-Vascular Test, Basal Metabolic Rate Test, and the Organic Efficiency Test.

Various statistical techniques will be used in analyzing these data. The physiological interpretation will be made of the various statistical findings. The physiology of each test will be explained in relation to the findings.

Organic Efficiency Test.—The Organic Efficiency Test was used in examining 196 veterans of a total of 233 veterans examined.¹ The remaining men were not allowed to take the stair climbing exercise; therefore, the full Organic Efficiency Test could not be secured.

The Organic Efficiency Test consists of five circulatory and respiratory and exercise tolerance measures. These measures are: sitting diastolic pressure, breath-holding twenty seconds after standard exercise, the difference between standing normal pulse rate and pulse rate two minutes after exercise, standing pulse pressure, and vital capacity. This test was developed as a result of twenty-six measures secured on two typical physical condition groups; the Springfield College Varsity Swimmers ("Good" Condition), and the Springfield College Infirmary Patients ("Poor" Condition).² The bi-serial correlation technique was used to determine the significant items of the twenty-six, and the beta values of the multiple correlation technique were used to determine the items which would constitute the test battery. The intercorrelations were carefully studied to use only measures that were not highly intercorrelated.

The Organic Efficiency Test was found to be statistically valid according to the criteria established in its construction, i.e., the "Poor" and "Good" condition groups. The bi-serial correlation, which is the validation correlation, was found to be .8334. The multiple correlation for the test battery is .947.

The organic measures in the test battery were "weighted" according to the beta values as found in using the five measures in the Fisher-Doolittle method of multiple correlation solution. These weights were used as multipliers for the T-scores for each of the five measures. The total Organic Efficiency Index is the summation of the five scores. The classification of organic efficiency is found by a rating scale which was developed by use of percentiles.

The physiological basis for the Organic Efficiency Index is that those individuals with high scores are organically efficient while those with

¹ J. H. McCurdy and L. A. Larson, "The Measurement of Organic Efficiency for the Prediction of Physical Condition in Convalescent Patients," *RESEARCH QUARTERLY* I: 4 (Dec., 1935), pp. 78-97.

² J. H. McCurdy and L. A. Larson, "The Measurement of Organic Efficiency for the Prediction of Physical Condition," *SUPPLEMENT TO THE RESEARCH QUARTERLY*, VI: 2 (May, 1935), p. 40.

low scores are organically inefficient. According to the groups that we have in this study, the varsity swimmers, college freshmen, and college track should fall in the upper range of the organic efficiency scale, while the U. S. veterans should fall in the lower range of this scale. If this occurs the bi-serial correlations should all be significantly high.

In Table I, we have summarized the results of the statistical analysis of the various groups of people. We have indicated the mean and standard error, per cent of veterans scoring on or above the median for criterion, and bi-serial correlations for all groups. In using the bi-serial correlation formula we have selected the formula recommended by Richardson and Stalnaker.³ This formula does not assume normality in the dichotomized variable. The bi-serial correlation values will represent the lower limit.

In Table II, we have in group one the people who represent the middle and upper range of the physiological fitness curve, and in group two the people (veterans) who represent the lower range of the curve.

McCloy's Two-Variable Cardio-Vascular Test.—This test was developed through the bi-serial correlation technique with the conventional methods of partial and multiple correlations.⁴ The criteria established in this study were the Burke Foundation Convalescent groups (original research data secured by Karpovich),⁵ who represent the "Poor" condition criterion, and the "Good" condition group who were active golfers. The two physiological measures in the test are the standing normal pulse rate and the standing normal diastolic pressure. The standard for scoring is the zero line. Those scores above the zero line would indicate "Good" condition, while those scores below the zero line would indicate "Poor" condition*

The author has recommended the use of this test for high school ages and above.⁶ We have used this test in this study to determine its value in measuring the cardio-vascular efficiency of the U. S. veterans and the college groups. We have calculated the mean, per cent of veterans scoring on or above the median for criterion, and the bi-serial correlation. This information will be found in Table I. The results of this analysis indicates that the test is not valid in classifying the people in the various groups into their proper place on the physiological fitness curve. A study now being conducted by the authors will further analyze the validity of this test.

³ Richardson and Stalnaker, "A Note on the Use of Bi-Serial R in Test Research," *Journal of Gen. Psychology*, VIII: 2 (April, 1933), 463-65.

⁴ C. H. McCloy, "A Cardio-Vascular Rating of Present Condition," *Arbeits-Physiologie*, V: 2 (Dec., 1931), p. 7.

⁵ P. V. Karpovich, "A Study of Some Physiological Effects of Golf," *American Physical Education Review*, XXXIII: 9 (Nov., 1928).

* For scoring equation, see summary, p. 10.

⁶ C. H. McCloy, "A Program of Tests and Measurements for the Public Schools," *Journal of Health and Physical Education*, VI: 8 (Oct., 1935), p. 21.

Barack's Cardio-Vascular Test.—The Barach Test is an index obtained by adding the systolic and diastolic pressures, then multiplying by the pulse rate.⁷ The index shows the state of activity of circulation. The test is based upon the idea that the addition of the systolic and diastolic pressures multiplied by the pulse rate is a significant index of physiological fitness. The normal index is 20 or under.⁸ A higher index means either an accomplishment of work with little effort or inability to expend the necessary effort. We have classified the various groups of people in this study according to this test. We found the range of classification of the veterans nearly identical to that of the college freshmen, varsity swimmers, and college track men. The failure of the test to differentiate between the good men (Swimmers and College Freshmen) and "Poor" men (veterans) indicates lack of significant value in the test for veterans. The results of this analysis will be found in Table I.

Tigerstedt's Cardio-Vascular Test.—The Tigerstedt test is an index of cardio-vascular efficiency as found by dividing the pulse pressure by the systolic pressure. According to the physiology of this test the U. S. veterans should fall into the lower range of the scoring scale, with the college track and varsity swimmers in the upper range, and college freshmen in the middle and upper range. We found in using this test in examining these various groups that the range of scores was somewhat higher for the college group, as you will notice is indicated by the mean for each group in Table I. The difference in means is not significantly wide to render the test valid for these groups. This is indicated by the bi-serial correlations.

Stone's Cardio-Vascular Test.—The Stone Cardio-Vascular Test is an index of cardio-vascular efficiency as found by dividing the sitting normal pulse pressure by the sitting normal diastolic pressure and multiplying by 100.⁹ The normal range is between 25 and 75, whereas anything above or below these values indicates poor cardio-vascular efficiency. The result of the analysis is found in Table I. The explanation will be found in the summary and physiological interpretations. According to Stone, the "pulse pressure measures the energy of the heart in systole in excess of the diastolic pressure." The diastolic pressure is an indication of peripheral resistance. Lamb speaks of this test as McKesson's.

Basal Metabolic Rate Index.—The Basal Metabolic Rate Test is an index of cardio-vascular efficiency as found by the following formula:

⁷ J. H. Barach, "The Energy Index (S.D.R. Index) of the Circulatory System," *Arch. Int. Med.*, 24 (1919), 509-513.

⁸ The point is moved three places to the left so as to avoid working with long numbers.

⁹ Willard J. Stone, "The Clinical Significance of High and Low Pulse Pressures with Special Reference to Cardiac Load and Overload," *Journal A.M.A.* (Oct. 4, 1913), 1256-1259.

TABLE I
CARDIO-VASCULAR TESTS ON U. S. VETERANS*
TOTAL GROUP OF VETERANS (196)

Cardio-Vascular Tests	A. U.S. Veterans ("Total" Group)			
	Key: 1. Varsity Swimmers (60) 2. College Freshmen (318) 3. College Track (29)			
	Mean and Standard Error	Per Cent of Veterans Scoring on or above Median for Criterion	Bi-Serial Correlation†	
McCloy's Test Two-variable	A. 6.40 ± 0.89			
	1. 9.84 ± 1.96	$A_1 = 39.77$	$A_1 = .1099$	
	2. 7.75 ± 0.82	$A_2 = 47.55$	$A_2 = .0473$	
	3. -5.09 ± 0.89	$A_3 = 82.81$	$A_3 = -.2863 \ddagger$	
Barach's Test	A. 18.85 ± 0.27			
	1. 17.80 ± 0.35	$A_1 = 59.39$	$A_1 = -.1229$	
	2. 17.75 ± 0.17	$A_2 = 62.71$	$A_2 = -.1571$	
	3. 17.69 ± 0.51	$A_3 = 65.50$	$A_3 = -.1045$	
Tigerstedt's Test	A. 26.74 ± 0.54			
	1. 30.07 ± 0.89	$A_1 = 35.57$	$A_1 = .1866$	
	2. 28.02 ± 0.44	$A_2 = 47.90$	$A_2 = .0793$	
	3. 30.83 ± 1.38	$A_3 = 31.12$	$A_3 = .1785$	
Stone's Test	A. 50.31 ± 1.05			
	1. 59.83 ± 1.96	$A_1 = 19.40$	$A_1 = .2618$	
	2. 64.47 ± 1.38	$A_2 = 20.58$	$A_2 = .3062$	
	3. 64.31 ± 2.48	$A_3 = 5.87$	$A_3 = .3062$	
Basal Metabolic Test	A. 11.28 ± 1.28			
	1. 10.17 ± 2.01	$A_1 = 44.30$	$A_1 = -.0269$	
	2. 7.45 ± 1.00	$A_2 = 56.34$	$A_2 = -.1035$	
	3. 15.34 ± 3.32	$A_3 = 36.03$	$A_3 = .0765$	
Organic Efficiency Test	A. 247.96 ± 4.23			
	1. 395.34 ± 5.88	$A_1 = 0.0$	$A_1 = .7432 \pm .035$	
	2. 362.90 ± 4.39	$A_2 = 1.02$	$A_2 = .6148 \pm .027$	
	3. 393.44 ± 12.89	$A_3 = 0.0$	$A_3 = .6282 \pm .054$	

*Criteria for organic efficiency evaluation (1) College Swimmers (60), (2) College Freshman (318), (3) College Track (29).

$$\dagger \text{Formula } r_{b1s} = \frac{M_2 - M_1}{\sigma y} \sqrt{pq}$$

No assumption of normality in dichotomized variable. The values for the bi-serial correlations represent the minimum limits.

‡The size of these correlations may appear to indicate a certain degree of validity for the test; however, the correlations are negative whereas according to the physiology of the test as suggested by the author the resulting correlations should be positive.

TABLE I—(Continued)
MINIMUM DEFECTS GROUP OF VETERANS (56)

Cardio-Vascular Tests	B. U.S. Veterans (Minimum Defects Group)		
	Mean and Standard Error	Per Cent of Veterans Scoring on or above Median for Criterion	Bi-Serial Correlations
McCloy's Test Two-variable	B. 6.97 ± 1.27		
	1. 9.84 ± 1.96	B1=39.89	B1=.1120
	2. 7.75 ± 0.82	B2=52.36	B2=.0199
	3. -5.09 ± 0.89	B3=89.82	B3=-.4332†
Barach's Test	B. $17.50 \pm .040$		
	1. 17.80 ± 0.35	B1=45.11	B1=.0528
	2. 17.75 ± 0.17	B2=48.43	B2=.0293
	3. 17.69 ± 0.51	B3=51.21	B3=.0313
Tigerstedt's Test	B. 26.72 ± 0.78		
	1. 30.07 ± 0.89	B1=38.13	B1=.2536
	2. 28.02 ± 0.44	B2=54.00	B2=.0604
	3. 30.83 ± 1.38	B3=32.14	B3=.2899
Stone's Test	B. 52.50 ± 1.48		
	1. 59.83 ± 1.96	B1=20.05	B1=.2635
	2. 64.47 ± 1.38	B2=21.51	B2=.1817
	3. 64.31 ± 2.48	B3=3.15	B3=.4258
Basal Metabolic Test	B. 5.89 ± 1.78		
	1. 10.17 ± 2.01	B1=31.75	B1=.1444
	2. 7.45 ± 1.00	B2=43.54	B2=.0323
	3. 15.34 ± 3.32	B3=24.88	B3=.2860
Organic Efficiency Test	B. 288.58 ± 5.51		
	1. 395.34 ± 5.88	B1=0.0	B1=.7754 ± .040
	2. 362.90 ± 4.39	B2=3.57	B2=.3382 ± .050
	3. 393.44 ± 12.89	B3=0.0	B3=.6867 ± .060

SUMMARY OF PHYSIOLOGICAL INTERPRETATIONS (TABLE I)

(1) McCloy's Two-Variable Cardio-Vascular Test.—

a) Formula for Scoring: .89 Standing Diastolic Pressure — Standing Normal Pulse Rate + 16. The standard for classification is the zero line. Above = "Good Condition," below = "Poor Condition."

b) You will observe in examining the column "Per Cent of Veterans Scoring on or Above the Median for Criterion" that the percentage of men on or above the median for the veterans is approximately the same or more than in the criterion group.

c) According to this test there is no physiological difference between the U. S. Veterans and the groups representing the criteria, i.e. Varsity Swimmers, College Freshmen, and College Track Men.

TABLE I—(Continued)
MAXIMUM DEFECTS GROUP OF VETERANS (140)

Cardio-Vascular Tests	Mean and Standard Error	C. U.S. Veterans ("Maximum Defects")		Per Cent of Veterans Scoring on or above Median for Criterion	Bi-Serial Correlations
		Key:			
		1. Varsity Swimmers (60)			
		2. College Freshmen (318)			
		3. College Track (29)			
McCloy's Test Two-variable	C.	6.54 ± 1.14			
	1.	9.84 ± 1.06	C1=39.71	C1=	.1076
	2.	7.75 ± 0.82	C2=45.63	C2=	.0390
	3.	-5.09 ± 0.89	C3=80.00	C3=	-.3024†
Barach's Test	C.	19.39 ± 0.34			
	1.	17.80 ± 0.35	C1=65.11	C1=	-.1959
	2.	17.75 ± 0.17	C2=68.43	C2=	-.2196
	3.	17.69 ± 0.51	C3=71.21	C3=	-.1669
Tigerstedt's Test	C.	26.52 ± 0.69			
	1.	30.07 ± 0.89	C1=34.54	C1=	.2044
	2.	28.02 ± 0.44	C2=45.46	C2=	.0839
	3.	30.83 ± 1.38	C3=30.71	C3=	.1982
Stone's Test	C.	49.43 ± 1.35			
	1.	59.83 ± 1.06	C1=19.14	C1=	.2905
	2.	64.47 ± 1.38	C2=20.21	C2=	.2968
	3.	64.31 ± 2.48	C3= 6.96	C3=	.3401
Basal Metabolic Test	C.	13.43 ± 1.62			
	1.	10.17 ± 2.01	C1=49.32	C1=	-.0821
	2.	7.45 ± 1.00	C2=61.47	C2=	-.1495
	3.	15.34 ± 3.32	C3=40.48	C3=	.0380
Organic Efficiency Test	C.	232.42 ± 4.94			
	1.	395.34 ± 5.88	C1= 0.00	C1=	.8063 ± .032
	2.	362.90 ± 4.39	C2= 0.00	C2=	.6368 ± .029
	3.	393.44 ± 12.89	C3= 0.00	C3=	.7075 ± .051

(2) *Barach's Cardio-Vascular Test.*—

a) Method of Scoring: Systolic + Diastolic × Pulse Rate (standing position). The decimal point is moved three places to the left so as to reduce the number. The normal index is 20 or under. As the index decreases it means an accomplishment of work with little effort or inability to expend necessary effort.

b) According to the physiology of the test, the Veterans should represent the upper range on the scale while the groups used as the criteria should represent the lower range. The number of veterans scoring below the "median" for the criterion can be found by subtracting the values in the column "Per Cent of Veterans Scoring on or Above the Median for the Criterion" from 100. This indicates the percentage "overlap" of the veterans.

c) There is no physiological difference between the various groups according to this test. The difference in the means is so small that it cannot be considered significant.

Pulse Rate plus Pulse Pressure minus 111.¹¹ This test has been recommended for clinical use. The results of the analysis will be found in Table I.

Tigerstedt's and Stone's Tests Applied to Veterans without Organic Efficiency Test.—A group of forty veterans were given the medical examination but were not given the Organic Efficiency examination or Test because of the stair climbing exercise, or because of the vital capacity and breath-holding measurements. The results of the analysis will be found in Table III. The physiological interpretation will be found as a summary in this table.

SUMMARY OF TABLE I CONTINUED

(3) *Tigerstedt's Cardio-Vascular Test.*—

a) Method of Scoring: Standing Pulse Pressure divided by Standing Systolic Pressure $\times 100$. The index should fall between 30 and 50. Above or below means an inefficient cardio-vascular system.

b) There is a very high percentage "overlap" in all groups. The mean for the veterans is somewhat lower, but not significantly than in the groups representing the criteria. From the efficiency standpoint the high score indicates greater cardio-vascular efficiency.

c) There is no physiological difference between the various groups according to the test.

(4) *Stone's Cardio-Vascular Test.*—

a) Method of Scoring: Sitting Pulse Pressure divided by Sitting Diastolic Pressure $\times 100$. Normal range is between 25-75. Above or below indicates "poor" cardio-vascular efficiency. Within the 25-75 range, as the score increases, it is an indication of greater cardio-vascular efficiency.

b) The percentage "overlap" in groups is lower in this test than any of the others except the Organic Efficiency Test. The test cannot be considered valid though it does tend to place the groups on the physiological curve.

c) The test tends to indicate physiological differences in the veterans as compared to the groups representing the criteria.

(5) *Basal Metabolic Rate Test.*—

a) Method of Scoring: Pulse Rate + Pulse Pressure — 111.

b) The Basal Metabolic Rate Test does not indicate the physiological differences between the veterans and groups higher on the physiological fitness scale. The percentage "over-lap" between groups is high.

c) The test is based on the pulse rate and pulse pressure. These values are not indicative of efficiency in these groups or the scoring device is not valid.

(6) *Organic Efficiency Test.*—

a) You will notice in examining the column "Per Cent of Veterans Scoring on or above Median for Criterion" that there is practically no

¹¹ A. W. Gale, *Lancet*, (London), June 13, 1931, p. 1287.

TABLE II
ORGANIC EFFICIENCY TEST—COMBINED CRITERIA

Combined Criterion and Veterans	Mean and Standard Error	Difference in Mean and Reliability of Difference	Sigma of Total Distributions	Relative Variability of Groups	Per Cent of Veterans Scoring on or above Median for Criterion	Bi-Serial Correlation and Probable Error
1. Swimmers—Freshmen and Track (407)	(1) 369.90 ± 3.71	121.94 ± 5.63	90.40	(1) 20.24	0.52	.8218 ± .017
2. "Total" Group—Veterans (196)	(2) 247.96 ± 4.23			(2) 23.38		
1. Swimmers—Freshmen and Track (407)	(1) 369.90 ± 3.71	81.32 ± 6.64	76.40	(1) 20.24	1.83	.5629 ± .041
2. "Minimum Defects" Group—Veterans (56)	(2) 288.58 ± 5.51			(2) 14.28		
1. Swimmers—Freshmen and Track (407)	(1) 369.90 ± 3.71	137.48 ± 6.18	99.40	(1) 20.24	0.0	.8185 ± .020
2. "Maximum Defects" Group—Veterans (140)	(2) 232.42 ± 4.94			(2) 25.15		

Summary and Physiological Interpretations.

1. The percentage of veterans reaching or exceeding the median for the criterion groups indicates definite separation between the groups by the Organic Efficiency Test. The veterans are again found in the lower range on the physiological curve with the swimmers, Freshmen, and Track Team, found in the middle and upper portion of the range.

2. The physiological interpretation in terms of each measure in the Organic Efficiency Test is the same as given in the Summary, Table I.

$$\text{Formula: } r_{b12} = \frac{M_2 - M_1}{\sigma_y} \frac{p}{q} \frac{z}{z}$$

Normality was assumed in dichotomized variable. (Bi-serial correlations represent maximum limits.)

TABLE III
VETERANS WITH PARTIAL EFFICIENCY EXAMINATION*

Criterion and Veteran Groups	Stone's Cardio-Vascular Test†			Tigerstedt's Cardio-Vascular Test‡		
	Mean and Standard Error	Per Cent of Veterans Scoring on or above Median for Criterion	Bi-Serial Correlation	Mean and Standard Error	Per Cent of Veterans Scoring on or above Median for Criterion	Bi-Serial Correlation
1. Swimmers (60)	(1) 59.83 ± 1.96	29.10	.2104	(1) 30.07 ± 0.89	40.30	.1280
2. Veterans (40)	(2) 52.50 ± 2.95			(2) 28.00 ± 2.96		
1. Freshmen (318)	(1) 64.47 ± 1.38	29.52	.1552	(1) 28.02 ± 0.44	47.70	.0008
2. Veterans (40)	(2) 52.50 ± 2.95			(2) 28.00 ± 2.96		
1. Track (29)	(1) 64.31 ± 2.48	24.90	.3297	(1) 30.83 ± 1.38	38.15	.1646
2. Veterans (40)	(2) 52.50 ± 2.95			(2) 28.00 ± 2.96		

*This group of veterans could not take the full organic efficiency test as the stair-climbing exercise, and in some cases breath-holding and vital capacity measurements were not advisable as result of the medical examination previous to taking the efficiency examination.

†The index score is obtained by dividing the sitting pulse pressure by the sitting diastolic pressure and multiplying by 100. See p. 12.

‡The index score is obtained by dividing the standing pulse pressure by the standing systolic pressure and multiplying by 100. See p. 12.

Summary and Physiological Interpretations.—

1. The Stone Cardio-Vascular Test is in accord with the physiology of the test; i.e., a higher index score for those high in cardiovascular efficiency. The interpretation of this would be a moderately high pulse pressure with a moderately low diastolic pressure. Both, of course, have limits at which point we will have the reverse. This test cannot be considered valid as far as recognizing the physiological differences within these groups.

2. The Tigerstedt Index is also in accord with its physiology, although the test cannot be considered valid as far as determining the physiological differences in the veterans as compared to our groups representing the criteria. The physiology of the test would be a moderately high pulse pressure with moderately low systolic pressure for an efficient individual.

TABLE IV
SUMMARY OF BI-SERIAL CORRELATIONS*

GROUPS	Organic Efficiency Test	McCloy's Cardio- vascular Test (2-Variable)	Barach's Cardio- vascular Test	Tigerstedt's Cardio- vascular Test	Stone's Cardio- vascular Test	Basal Metabolic Rate Test
"Total" Group of Veterans (196)						
1. Veterans-Swimmers	.7432 ± .035	.1099	-.1229	.1886	.2618	-.0269
2. Veterans-Freshmen	.6148 ± .027	.0473	-.1571	.0793	.3062	-.1035
3. Veterans-Track	.6282 ± .054	-.2863†	-.1045	.1785	.3002	.0765
"Minimum Defects"—Veterans (56)						
1. Veterans-Swimmers	.7754 ± .040	.1120	.0528	.2536	.2635	.1444
2. Veterans-Freshmen	.3382 ± .050	.0199	.0293	.0604	.1817	.0323
3. Veterans-Track	.6867 ± .060	-.4332†	.0313	.2899	.4258	.2860
"Maximum Defects"—Veterans (140)						
1. Veterans-Swimmers	.8063 ± .032	.1076	-.1959	.2044	.2905	-.0821
2. Veterans-Freshmen	.6368 ± .029	.0390	-.2196	.0839	.2968	-.1495
3. Veterans-Track	.7075 ± .051	-.3024†	-.1669	.1982	.3401	.0380

*See Note 3 (§) under Table I, p. 9. This note will interpret these correlations in terms of the physiology of the test.

$$\text{*Formula } r_{b1s} = \frac{M_2 - M_1}{\sigma_y} \sqrt{\frac{pq}{pq}}$$

Richardson and Stalkner, *Op.cit.*, p. 463-5. No assumption of normality in dichotomized variable. (Bi-serial correlations represent minimum limits.)

"overlap" between the veterans and the criterion groups. This indicates that the veterans are found in the lower range on the physiological curve, while the criterion groups are found in the upper range.

b) The bi-serial correlations are all significant and indicate, in general, that the veterans are physiologically different from the criterion groups in that they have (1) higher sitting diastolic pressure, lower breath-holding abilities after exercise, lower sub-normal pulse rates in comparing normal with pulse rate two minutes after exercise, lower pulse pressures, and lower vital capacities.

SUMMARY

In Table IV we have indicated the bi-serial correlations for the six Cardio-Vascular Tests in this study. The organic measures secured on these people were taken at one time and included all six tests. This would eliminate fluctuations which may occur from day to day. We can say therefore that except on the Organic Efficiency Test the low bi-serial correlations for all other tests are not due to experimental conditions, but are due to the lack of validity for the tests in these particular groups. The low bi-serial correlation is interpreted as two groups of people falling into the same range on the cardio-vascular efficiency rating scale as indicated by each test.

CONCLUSIONS

1. The McCloy Two-variable Cardio-vascular Test, Barach's Cardio-vascular Test, Tigerstedt's Cardio-vascular Test, and the Basal Metabolic Rate Test are not valid as determined by the criteria established for the measurement of cardio-vascular efficiency of the United States Veterans.
2. The Stone Cardio-vascular Test, although it cannot be considered valid according to our criteria, does have a higher degree of validity than the above four tests.
3. The Organic Efficiency Test can be considered valid as an index of cardio-vascular efficiency according to our established criteria.

**STANDARDS IN ATHLETICS
FOR
GIRLS AND WOMEN**

**Guiding Principles in the Organization
and Administration of Athletic Programs**

**A PROJECT OF THE
NATIONAL SECTION ON WOMEN'S ATHLETICS
OF THE
AMERICAN PHYSICAL EDUCATION ASSOCIATION**

Prepared by
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of the
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FOREWORD

This is a statement of a point of view regarding the nature and conduct of athletics for girls and women. It represents the position of the National Section on Women's Athletics of the American Physical Education Association. The National Section serves the interests of administrators, teachers, and leaders of informal and athletic programs in schools, communities, commercial, industrial, and recreational groups.

The statement includes:

A discussion of the construction and conduct of the program in terms of the method of classifying athletic activities, bases of selecting them, and factors concerned in adapting them to various age groups and to various situations.

An analysis of leadership in athletics from the point of view of the administrator and from the point of view of the teacher.

An application of the foregoing for the participant herself.

This statement was prepared by a committee of ten persons appointed by the Legislative Board of the National Section on Women's Athletics in April 1933. The Committee carried out its work under the following Section Chairmen: Grace B. Daviess, University of Cincinnati, 1932-33; Eline von Borries, Goucher College, 1934-35; Elinor M. Schroeder, Wellesley College, 1936—. The material has been reviewed by the Research Committee of the National Section on Women's Athletics; Chairman: Dorothy Humiston, Iowa State Teachers College.

Any contemporary statement of standards for the conduct of athletics for girls and women rests upon a historical development which goes back approximately fifty years. The beginnings of organized sports for women in America coincide with the appearance of these activities in the programs of organizations such as the Y.W.C.A., and in agencies such as the schools, particularly the women's colleges. Paralleling this development has been the steady growth of interest among informal community groups over the same period.

The first highly organized game to appear in a college program was basketball, introduced as early as 1899 at Smith College by Senda Berenson, in a form adapted from the men's game invented in 1898. Hockey, introduced from England by Constance Applebee, and swimming and track and field athletics were engaged in by women as early as the first decade of the twentieth century. In this period, a large part of the sponsorship of organized women's athletics came from athletic clubs and private associations which reflected the trend of popular interest more quickly than did the schools and colleges.

The first authoritative action to regulate and guide women's athletics was taken in 1907. The Women's Basketball Guide issued in that year announced the establishment of a Women's Rules Committee, making public the fact that such a committee was in service. In 1916

the American Physical Education Association recognized the value of the work done, and other needs existing, and formally appointed the Women's Athletic Committee, charged with the task of establishing official rules and of rendering advisory service to the rapidly developing program of women's athletics. This group has in the intervening years set a pattern for the playing of games by girls and women in this country, formulating rules, publishing official guides, and establishing many services and aids to the conduct of athletics. Out of the work of this body, now functioning as the Women's Rules and Editorial Committee, has grown the larger body, the National Section on Women's Athletics of the American Physical Education Association, under whose auspices these standards are published.

The second major agency for the establishment of standards has been the Women's Division of the National Amateur Athletic Federation, organized as a private agency in 1923. For thirteen years, the Women's Division has conducted an educational campaign based on the safeguarding of health and the provision of wide opportunities for wholesome play under trained women leaders. Its concise platform of ideals and standards has been placed in the hands of teachers and organizers of women's athletics in every part of the world.

The standards here published represent an extension of this many-sided interest in ensuring the continued growth of women's athletics in a worth-while direction. The method used included a broad sampling of expert opinion, an examination of available scientific evidence, and a study of present practice.

A standard is an authoritative rule or model constructed as a guide to action. To be valid:

Standards must represent the most reliable current expert opinion.

Standards must be endorsed by all available scientific findings.

Standards must be constructed definitely to meet the situation at hand.

Standards must be issued by responsible and recognized agencies in the field.

Standards serve as a basis for program making, as a means for motivation and stimulation of activities, and as a method of appraisal. To be effective in guiding action, standards must be sufficiently general to operate in many situations and sufficiently specific to indicate a course of action in any given situation. Furthermore, to ensure their continued usefulness, standards must be flexible and subject to revision rather than fixed and traditional. The basis for the revision of standards is a revision in the data from which they are derived. Therefore, in view of the nature and the function of standards, their formulation and revision must be entrusted to those agencies which represent responsible, impartial, and democratically constituted leadership in the field. Once established by such means, standards have the force of authoritative statement which renders them binding upon all persons subscribing to good practice.

THE STANDARDS

The One Purpose of Athletics for Girls and Women Is the Good of Those Who Play.

THE PROGRAM

The Program Must Be Based upon a Pro-
found Knowledge of the Individual and of
the Environment in Which She Lives.

Standards for the program are:

The construction of the program of athletic activities must be based upon a knowledge of the elements of individual differences, which are age, physique, interests, ability, experience, health, and stage of physiological, emotional, and social maturity.

Athletic activities must be selected and classified on the basis of the best current scientific evidence and in terms of the many interrelated factors entering into play.

The selection of athletic activities must be based upon an awareness of these three aspects: first, the analysis of activities from simple to complex; second, the classification of individuals in ability from novice to expert; and, third, in terms of present and future use.

Each community must be studied to use, to improve, and to increase all available places for wholesome play.

Wise conduct of an athletic program must make provision for every player to lead according to her merit and skill in leading, and to follow according to her willingness and ability to adapt herself to others and to a common end.

Wise conduct of the athletic program must provide for continuous challenge to the ingenuity, organizing powers, and powers of appraisal of every player.

The acquisition of skill must be promoted by using a wide variety of sound, effective methods employed always as means to an end.

Participation in athletics must depend upon a comprehensive and reliable evaluation of the health status of the participant; and upon a classification of fitness which takes into account the quality and extent

of participation as well as the type of activity, and individual differences as well as general organic normality.

Special restrictions upon participation, such as participation during the menstrual period, must be determined by individual differences, with conservatism in the absence of final evidence as the rule.

The program must be scheduled to conform to an optimum plan of regular play periods of limited length at frequent intervals, held out of doors whenever possible, and at times of day when vital energy is at a high level and when interference with a hygienic regimen is not entailed.

The element of competition, present in all organized group play, must be made to function as the fundamental constructive factor in the athletic program.

Provision must be made in equal terms for all players to participate and to compete in terms of actual ability and maximum expertness.

The method of organizing competition must be determined by the desirable possibilities it provides, not by the type into which it can be classified.

The official in a contest must measure up to all of the qualifications set for leadership, that is, her exercise of authority must be sound, consistent, and expert.

The official rules authorized by the National Section on Women's Athletics of the American Physical Education Association must be used.

The athletic program must progressively educate the participant away from the need for artificial incentives and tangible awards.

THE LEADER

**Leadership, to be Constructive, Must Be
Sound, Expert, and Consistent.**

Standards for the leader are:

The administrator as a leader must be responsible for the realization of the purpose for which an athletic program is conducted.

The administrator as a leader must ensure the accomplishment of his purpose by the selection of properly qualified teachers and the

honest delegation of authority to them.

The administrator as a leader must provide and supervise a physical setting for athletics which conforms to the educational character of the activities.

The administrator as a leader must act as final authority over the important phases of an athletic program such as health safeguards, degree and type of competition, and method of financing.

The administrator as a leader must be responsible for reflecting in the public relations accompanying an athletic program the character and purpose of that program.

The teacher as a leader must herself exemplify those traits—physical, mental, emotional, social—which she seeks through her teaching to inculcate in others.

The teacher as a leader must command the facts and have mastery of the techniques which function in athletics.

The teacher as a leader must realize that the results of teaching are desirable changes in those she leads, and must appraise these results by the most objective means available.

THE PARTICIPANT

The Participant Must Assume Responsibility for the Consequences of Her Own Behavior.

Standards for the participant are:

The participant must develop the desire and habit of playing in terms of her individual needs and interests.

The participant must take increasing responsibility for her own health.

The participant must equip herself with a variety of skills sufficient to provide present and future satisfaction.

The participant must learn to engage in competition wisely as a means of enjoyment.

Every participant must consider herself a cooperative member of her group and also regard herself as a potential leader.

THE PROGRAM

CONSTRUCTION OF THE PROGRAM

The construction of a program of athletics for girls and women which takes into account individual and environmental differences can be analyzed under the following points: those who play; the place to play; the content of play; the grouping for play; the purpose of play.

Those Who Play

No two individuals develop alike. There is as wide a difference within groups as there is between groups. Therefore generalizations only, based upon current scientific opinion, may be stated for certain age groups.

The following age classification is used as a basis for grouping girls and women:

Pre-adolescent—ten to twelve years

Adolescent—early adolescent—thirteen to fifteen years

late adolescent—fifteen to eighteen years

Young adult—nineteen to twenty-four years

Mature adult—over twenty-four years

The Pre-adolescent.—(ten to twelve years). The child at this age is in a formative stage of growth. She begins to show adult proportions. Her organs are well developed, the heart developing rapidly, and susceptibility to disease decreasing. Her muscular control is excellent and she needs exercise and hygienic activities. However, fatigue and poor posture frequently accompany this period in the child's growth and care must be taken to avoid impairing her health.

Emotionally she is developing, too. At an earlier period she was interested primarily in herself and her immediate family. Now her horizon is enlarged and she turns to larger groups, finding satisfaction in winning approval from playmates. Girls are apt to play with girls and rivalry becomes apparent. The girl's interest in imitation decreases and the impulse to explore increases. Children of this age group are interested in a variety of informal games. Games of tag and games which include such skills as running, jumping, climbing, throwing are universal. There is an increased interest in simple team games such as dodgeball, endball, and informal group play such as hiking, picnicking, and swimming. In school, boys and girls usually play together. Segregation in terms of the games program should be based primarily upon differences in strength and endurance. In terms of the social values of the play program there should be as little segregation as possible.

The Adolescent.—(early, thirteen to fifteen years; late, fifteen to eighteen years). In general, this group makes up the junior and senior high school. This young person experiences suddenly a surprising increase in height and weight. This growth is at times so rapid that it takes the child a little time to get accustomed to her increased size. It is the age of sexual maturity with its concomitant, the development of secondary sexual characteristics. Although muscular growth is, at this period, from fundamental to accessory, that is, from large to small muscle groups, accuracy of movement is not necessarily characteristic. The awkward and tired adolescent is familiar to all who deal with this age group.

Emotionally, the child at times has difficulty in adjusting to psychological as well as to physiological factors. She wants to be free, to live her own life, to put into effective action her new interests, energies, and ideals. Family associations become less important, and new strong friendships are formed. She is sometimes both self-conscious and sex-conscious, and friendship with boys assumes new significance. She deeply needs approval, admiration, sympathy, and understanding.

Team games of higher organization, which make an increasing demand upon mastery of skills, become important for this group. Cooperative planning and playing are satisfying. Individual sports which have a social and heterosexual significance as well as a high degree of skill are especially desirable. Coeducational activities should play an increasingly greater role in the whole athletic program.

The Young Adult.—(nineteen to twenty-four years). Growth in this age group continues in a less conspicuous manner. These are maturing years in which physical efficiency and physical hardihood are apparent. Assimilation of previous experiences goes on. The young adult participates more often in group and community life. She assumes responsibilities and welcomes opportunity for leadership. Because of a multiplicity of interests there is a tendency to indulge in fewer athletic activities, but sports which young men and women play together become increasingly popular. The expert in sports often emerges at this point and it is the responsibility of everyone dealing with her to assure her emotional and social, as well as her physical development.

The Mature Adult.—(over twenty-four years). A mature person is one who faces willingly the consequences of her own behavior. She is increasingly aware of her responsibilities to herself and to others. She faces reality honestly. She does not escape from reasonable authority or from definite responsibility. In terms of general or physiological development she has matured. Her life is set in fairly definite motor patterns. The acquisition of many new skills is the exception rather than the rule. Her vigorous activity becomes more satisfying. Games and sports which men and women play together are still popular. The

recreational life of the mature adult should include many diversified activities, not only in the field of athletics but in the field of art, music, and literature. Athletic activities appeal to an older person as one means of keeping fit.

If during her experiences in games and sports, she has had fun, has played with others, has excelled in some particular sport, has had the satisfaction of exercising leadership, she will probably not only continue to play, but actively and enthusiastically to support a good athletic program for herself, for her family, and for her community.

The Construction of the Program of Athletic Activities Must Be Based upon a Knowledge of the Elements of Individual Differences, Which Are Age, Physique, Interests, Ability, Experience, Health, and Stage of Physiological, Emotional, and Social Maturity.

The Place to Play

Girls may be classified carefully, the activities may be planned and organized wisely, but unless there are adequate play spaces, play facilities, and play equipment, the athletic program will be inevitably handicapped.

Communities must assume some responsibility in providing places to play. Unquestionably, in contemporary life, there is more time to play. The trend towards shorter working hours makes it imperative that people understand the need for productive use of leisure time. Whole-some active play is one productive use for leisure hours. Urban groups, rural groups, industrial groups should make concerted and intelligent effort to analyze their play needs and their play resources and to use, convert, and build fine play areas.

A simple check list by which the resources of a specific community may be analyzed follows:

Locale

- | | |
|--|---|
| <p>A. Natural Facilities of the Community</p> <ol style="list-style-type: none"> 1. Woods and trails 2. Mountains 3. Camping sites 4. Lakes and streams <p>B. Seasonal Characteristics</p> <ol style="list-style-type: none"> 1. Climate 2. Necessary indoor facilities 3. Summer sports 4. Winter sports 5. Water sports | <p>C. Economic Influences</p> <ol style="list-style-type: none"> 1. Rural 2. Industrial 3. Urban 4. Suburban <p>D. Educational Influences</p> <ol style="list-style-type: none"> 1. Schools 2. Churches 3. Music, art, dramatic, and community centers |
|--|---|

E. Religious Influences

1. Inherited beliefs which influence types of play
2. Church leadership in recreation
3. Church opposition to recreation of various kinds

F. Social and Political Influences

1. Cooperation of groups

2. Local, state and national provision for play

3. Influences of foreign-born groups

- a. in sports

- b. in dance

- c. in music, literature, and art.

Play Facilities**A. Public**

1. Schools
2. Community centers
 - a. national
 - b. state
 - c. local

B. Semi-Private

1. Churches
2. Y.W.C.A.

3. Denominational Community Centers

4. Scouts, Girl Reserves, Camp Fire

C. Private

1. Clubs
2. Industrial play spaces
3. Individual play spaces

Outdoor Facilities**A. Archery ranges****B. Beaches and swimming facilities (including outdoor pools)****C. Bicycle paths****D. Bowling greens****E. Bridle paths****F. Camps****G. Courts**

1. Badminton
2. Handball
3. Shuffleboard
4. Squash
5. Tennis
6. Volleyball

H. Field Houses**I. Fish streams****J. Golf links****K. Horseshoe pitching space****L. Ice skating rinks****M. Jumping pits****N. Parks****O. Playfields**

1. Baseball

2. Basketball

3. Football (used for other games by girls)

4. Hockey

5. Soccer

6. Lacrosse

- P. Playgrounds (including swings, slides, trapeze and other playground equipment)

Q. Roller skating rinks**R. Running tracks****S. Ski slides****T. Trails****Indoor Facilities****A. Archery ranges****B. Baseball diamonds****C. Bowling alleys****D. Courts**

1. Badminton
2. Basketball
3. Handball

4. Shuffleboard

5. Squash

6. Tennis

7. Volleyball

- E. Ice skating rinks

- F. Roller skating rinks

- G. Swimming pools

**Each Community Must Be Studied to Use,
to Improve, and to Increase All Available
Places for Wholesome Play.**

The Content of Play

There are many ways of classifying athletic activities for girls and women. In any classification system there is apt to be duplication and overlapping. Any system which is simple, workmanlike, and does not violate basic principles should be used. It is impossible within the framework of this section to present an exhaustive list of games. These games listed are suggestive and indicate types of activity. Any standard work on games will furnish additional material which by careful analysis can be placed in its appropriate place.

Athletic activities may be classified according to *types of activity* and according to the *factors determining the degree of strenuousness, complexity, and competition*.

Types of Activities

(10 to 12 years)

I. Ball Games

A. Baseball Types

1. Liberty Bat Ball
2. Schlag Ball
3. Long Ball
4. Tap Baseball
5. Softball

B. Basketball Types

1. Dodgeball
2. Endball
3. Captain Ball

C. Field Types

1. Line Soccer
2. Corner Kickball

D. Net Games (without rackets)

1. Newcomb
2. Bounceball
3. Ring or Deck Tennis
4. Cageball

E. Net Games (with rackets)

1. Paddle Tennis

2. Table Tennis

II. Track Events

A. Running

1. Short Dashes (up to 40 yds.)

2. Relays

B. Jumping

1. Standing Broad Jump

C. Throwing

1. Baseball—Distance
2. Soccer Ball—Distance

III. Swimming

1. Short Distances (20-40 yds.)

2. Strokes for Form

3. Water Games

4. Simple Diving

IV. Miscellaneous

1. Rope Jumping

2. Hiking

3. Bicycle Riding

4. Roller Skating

5. Coasting

6. Ice Skating

(13 to 18 years)

I. Ball Games

A. Baseball Types

1. Schlag Ball
2. Hit-Pin Baseball
3. Soccer Baseball
4. Softball

B. Basketball Types

1. Dodgeball
2. Endball
3. Captain Ball
4. Pinball
5. Nine Court Basketball
6. Basketball (15 to 18 years)

C. Field Types

1. Corner Kickball
2. Fieldball

3. Soccer

4. Speedball

5. Field Hockey (15 to 18 years)

6. Lacrosse (15 to 18 years)

D. Net Ball Games (without rackets)

1. Newcomb

2. Giant Volleyball

3. Ring or Deck Tennis

4. Volleyball

E. Net Ball Games (with rackets)

1. Paddle Tennis

2. Table Tennis

3. Badminton

4. Tennis

- F. Wall Games
 - 1. Handball
 - 2. Squash
- II. Track Events
 - A. Running
 - 1. Dashes (up to 75 yds.)
 - 2. Low Hurdle Relays
 - B. Jumping
 - 1. Standing Hop Step
 - 2. Standing Broad Jump
 - C. Throwing
 - 1. Basketball—Distance
 - 2. Baseball—Distance
 - 3. Shot-Put (6 to 8 lbs)*
 - 4. Discus Throw *
 - 5. Javelin Throw *
- III. Swimming
 - 1. For Speed (up to 50 yds.)
- 2. Strokes for Form
- 3. Types of Diving (High Dive Not Recommended)
- 4. Water Games
- 5. Lifesaving Events
- IV. Miscellaneous
 - 1. Hiking
 - 2. Skating (Roller, Ice)
 - 3. Coasting
 - 4. Horseshoe Pitching
 - 5. Bowling
 - 6. Shuffleboard
 - 7. Horseback Riding
 - 8. Archery
 - 9. Golf
 - 10. Bicycle Riding
 - 11. Fencing

(19 to 24 years)

- I. Ball Games
 - A. Baseball Types
 - 1. Hit Pin Baseball
 - 2. Softball
 - B. Basketball Types
 - 1. Basketball
 - C. Field Types
 - 1. Soccer
 - 2. Fieldball
 - 3. Speedball
 - 4. Field Hockey
 - 5. Lacrosse
 - D. Net Ball Games (without rackets)
 - 1. Ring or Deck Tennis
 - 2. Giant Volleyball
 - 3. Volleyball
 - E. Net Ball Games (with rackets)
 - 1. Paddle Tennis
 - 2. Table Tennis
 - 3. Badminton
 - 4. Tennis
 - F. Wall Games
 - 1. Handball
 - 2. Squash
- II. Track Events
 - A. Running
 - 1. Dashes
 - 2. Relays
 - 3. Hurdling (2 ft.)
 - B. Jumping
 - 1. Broad Jump
 - 2. High Jump †
 - 3. Running Hop, Step, and Jump
 - C. Throwing
 - 1. Baseball Distance
 - 2. Shot put †
 - 3. Discus Throw †
 - 4. Javelin Throw †
- III. Swimming
 - 1. For Speed—up to 75 yds.
 - 2. Water Games
 - 3. Diving
 - 4. Lifesaving Events
- IV. Miscellaneous
 - 1. Hiking
 - 2. Skating (Ice—Roller)
 - 3. Coasting
 - 4. Horseshoe Pitching
 - 5. Bowling
 - 6. Shuffleboard
 - 7. Horseback Riding
 - 8. Archery
 - 9. Golf
 - 10. Fencing
 - 11. Bicycle Riding
 - 12. Boating
 - a. Sail
 - b. Ice
 - c. Canoeing
 - 13. Skiing

* Not recommended for junior high girls. Described in Athletic Handbook for Women, 1935-1936, A.P.E.A. However, use of them is questioned.

† Described in Athletic Handbook for Women, 1935-1936, A.P.E.A. However, use of them is questioned.

Factors Determining Degree of Strenuousness, Complexity, and Competition.—*Kind and degree of the skills involved:* amount of strength, agility and control of one's self and of the implements of play; these skills adapted to play with a partner or a team and against one or a number of opponents.

Number and arrangement of players: playing alone, with a partner, or a team; playing against an impersonal standard; playing against an opponent or opponents.

Duration of play: short or long, sporadic or continuous.

Amount and kind of contact between opponents: individual independent play, back and forth play; side against side; team against team.

Basis upon which victory is determined: self against a standard; self with partner; side or team against opponents.

Nature of the victory: simple success or failure; winning a game or a match; winning a series; receiving an award; becoming a champion.

**Athletic Activities Must Be Selected and
Classified on the Basis of the Best Current
Scientific Evidence and in Terms of the
Many Interrelated Factors Entering into
Play.**

Grouping for Play

People usually play in the following groups:

Individual (playing alone)	Large Informal Group
Partners (includes foursomes)	Informal Team
Small Informal Group	Formal Team

Individual.—Individual play is valuable to people of all ages. Social play is important, but individual play offers a release from emotional strain and serves to help make the individual self-sufficient. It reflects true interest, is spontaneous and has its place in a planned program. Some examples are: bouncing a ball by count, jacks, riding a bicycle, practicing tennis by hitting a ball against a wall, doing stunts, skating, and swimming.

Partner.—Games with a partner or with two sets of partners are enjoyable and often convenient. Partner grouping is particularly popular with boys and girls of adolescent age. Beyond school age the partner and foursome groupings are popular because they are practical. The actual business of life fills many hours and there is less often a

planned program for play as there was in school. It is sometimes difficult to organize teams, to find places to play, and to hold the interest of an entire group. It is much simpler to find one or two people who will play a game at a given time than it is to organize teams. For this reason partner and foursome games are especially useful and popular during young adult and adult years. Games for partners and foursomes include informal bounce, throw, and catch games played by children; and games such as tennis, badminton, table tennis, and activities such as archery, quoits, and golf.

Small Informal Group.—The use of small informal groups is of particular social value. Girls from the ages of ten through thirteen enjoy active games which are easily organized. They choose such games as one ole cat, long ball, tag games, and races. The group is divided, making two sides, thus providing simple competition with accompanying interest. Women of adult years usually enjoy playing informally in small groups with or without competition. It is not unusual to observe women employed in industry using the noon hour or the hours before and after work to play games of this type. Newcomb, softball, ring tennis, bowling, hiking, and swimming offer opportunities to enjoy activities together. Such games fulfill a real need in those situations where there is neither the time nor the energy for strenuous games of high organization.

Large Informal Group.—Children naturally tend to play in small groups. If, because of crowded facilities, they are brought together in large groups, they should be divided so that only rarely are they all playing the same game. There are instances, however, where large groups of adults may enjoy mass playing. Games suitable for these large groups will be found in books on social and recreational games. Cageball, mass races, endball, dodgeball, and some tag games are recommended.

Informal Team.—In many respects an informal team resembles the small informal group. It differs because teams are used when games with definite rules and requiring some organization, are played. Games in this group are suitable for girls and women from ten years of age through adulthood. For example, dodgeball may be played by teams of six or ten or twenty. The play space may be in circles or in courts. Very specific or only general rules may be followed. There have been instances of dodgeball tournaments where highly skilled teams were evenly matched and the games were swift and quite strenuous. Giant volleyball and regular volleyball are games of the same type. Ring tennis may be played successfully with teams of four to six on a side, the teams becoming skilled in working together. The team working together, using a plan or pattern, distinguishes this type of grouping from

that of the informal groups. If the same informal groups continue to play together, they invariably develop into informal teams.

Formal Team.—Interest in highly organized games is shown by the girl of about thirteen years of age and continues throughout adulthood. However, games of high organization are used less frequently by adult women. Games in this group require organization, teaching, practice, skill, spaces to play, and officials to conduct the activity. To be played well they also require other teams of similar skill. Examples of formal team games are softball, basketball, soccer, and hockey. These are best suited for use in secondary schools and colleges. In general, facilities are available there and girls and young women are classified rather definitely. There is a better opportunity to regulate the membership of teams within a school so that competition will be interesting. In some community centers, especially in cities, conditions are favorable for organizing formal teams.

There is more chance of harmful results to girls and women when playing formal team games than when playing games of lower organization. This is because the games are more strenuous, they admit of a higher degree of competition, there is a strong urge to play hard for the team, the player has a critical audience in the other team members, time periods for play are set, the games are traditional, and in some instances superior performance is expected.

The formal team game offers its greatest usefulness during school years where it may be controlled by educational principles and for young women in community centers and industrial groups where competent leadership is available. Although definite provision should be made for girls with a high degree of skill, the formal team game offers its greatest danger because of unscrupulous promoters who use the interest of the game and its high competitive possibilities to encourage audiences.

The Purpose of Play

Physical activity is necessary for growing bodies. The joy in natural play activities is of great value to persons of all ages. If all girls and women engaged in active sports could say, "I play because I enjoy playing," one of the most valuable results of play would be realized.

The social values of play appear to be more important than ever before. Ability to get along with others in a friendly manner in unexpected and trying situations may mean the difference between a progressive civilization and regression into outworn ways. Play fields furnish fertile soil for social growth. Leisure hours offer a good opportunity to develop wholesome values through play.

Girls of school and college age should be able to find opportunities for constructive play during out-of-school hours and vacations. The girl should bring from school knowledge of games and a desire to play.

The community should offer facilities and qualified leadership so that her play may continue through the years from level to level without interruption. The responsibility for providing opportunities rests in the last analysis upon the parents as voting citizens.

Every young woman should have the opportunity to play with both young women and young men of her own age group. Informal seasonal tournaments logically follow the play of high school and college days. Public, semi-private, and private facilities should be available for use by young people. This means that the young citizen must assume responsibility. Her first responsibility is to see that present facilities are given the proper care and protected from misuse. She should cooperate with social planning groups in planning for the future or should help organize such groups if they are lacking in her community. Each young woman has a responsibility to plan her personal budget to allow for the expenses necessary to take part in athletic activities. Items such as suitable play shoes, a tennis racket, bow and arrows, and necessary fees should be included definitely in her budget. She will no doubt carry this "budgeting for play" into her household as she becomes a wife and mother.

The adult has been caught practically without preparation in a world of shortened work days and added leisure. Many women of today lacked opportunity to play athletic games in their youth and, consequently, active play is not a part of their routine of living. Community classes offering dancing and the less strenuous play activities are growing in popularity because they fill a very definite need. Outdoor seasonal recreation has been planned successfully for groups of women. Many women who have been fortunate in having participated in games and athletic sports during school and college days are helping their communities through volunteer service to organized groups. All women should assume responsibility by giving their support to future planning and should understand and welcome the suggestions of the younger generation.

**The Construction of the Athletic Program
Must Be Based upon an Awareness of
These Three Aspects: First, the Analysis
of Activities from Simple to Complex; Sec-
ond, The Classification of Individuals in
Ability from Novice to Expert; and Third,
in Terms of Present and of Future Use.**

CONDUCT OF PROGRAM

A well conducted program of athletics will have two characteristics.

First, it will be like every other similar program in being based on sound, general, universal principles. Second, it will be different from every other similar program in being carefully adapted to specific local conditions. The first characteristic comes from the fact that all good programs, regardless of auspices or special classification, have as their point of reference the welfare of the participants. The second characteristic is the logical expression of the same interest in the participant, interpreted in terms of local needs.

A general discussion of standards allows only a consideration of the principles and procedures common to all situations where athletics are carried on. The interpretation of these principles and procedures in local terms is a matter of the good faith, judgment, and skill of those responsible for the actual conduct of play.

The Player

Just as it is true that leadership is the essential role of the administrator and the teacher, so is it true that leadership is a vital experience for the player. This should be true for every player. Every person who plays games with others should be interested in earning election to leadership. This is a natural concomitant of the interest in playing. Likewise, every participant should be given fair opportunity to exercise this interest. This opportunity, if it is to include everyone, must be planned. Such planning is one of the primary tasks of the teacher.

The reciprocal ability to follow demands the same provisions. Too often in games, leadership is no more than undisciplined and basically irresponsible aggressiveness. Following, in the same terms, is reduced to submission or grows out of shyness or inadequacy in the follower. The athletic program which is conducted without the necessary planning for control of the behavior involved in play, fosters this type of leading and following. Under these conditions, competition is apt to be the sole force at work to incite interest. Cooperation—the complement of competition—has little chance to operate as a motive or as an educational influence. The player becomes the victim of her own weakest traits. As a person, she learns nothing from playing except the dubious lesson of following her easiest inclinations. The impulse to bully and to be timid are too often augmented by playing games.

**Wise Conduct of an Athletic Program
Must Make Provision for Every Player to
Lead According to Her Merit and Skill in
Leading, and to Follow According to Her
Willingness and Ability to Adapt Herself
to Others and to a Common End.**

A second consideration in the conduct of the program is the amount and kind of actual responsibility assigned to the teacher and to the player. It is often considered an index to good organization on the part of the teacher to count how many problems the teacher solves in advance, how thoroughly she provides for every contingency of play such as facilities, arrangements, and safety. In a well conducted program, the teacher will refrain from mechanizing the situation by assuming every prerogative of this kind. The index to good organization will be reversed. The measure of achievement for the teacher will be the extent to which the players meet and solve their own problems. The balance between imagination and foolishness on this score is determined by judging the results in the players. Unquestionably certain kinds of foresight, certain arbitrary regulations governing health and safety, and all of the ultimate choices in matters affecting the good of the participants will remain the prerogative of the teacher. But ample room for the solving of the problems of play by the players remains.

**Wise Conduct of the Athletic Program
Must Provide for Continuous Challenge to
the Ingenuity, Organizing Powers, and
Powers of Appraisal of the Players.**

The Acquisition of Skills

The two preceding standards for the conduct of the program are in large part realized through the plan made for teaching skills. In the teaching and acquisition of skills, specific local factors play a large part. The ability of a player to learn a new skill or to improve an old one depends upon a series of elements about which it is impossible to generalize. However, there are some common patterns for teaching the prescribed skills which are adaptable to most situations.

A combination of methods in which the player gets a conception of the whole game, and analyzes and practices skills in units and combinations occurring within the game as well as in isolated parts is ordinarily most satisfactory. The adding together of single, separately-learned skills does not result in ability to play a game involving all of these skills used in a variable and dynamic situation. Some sense of the whole game and some experience with the many possibilities of actual play are necessary both for the maintenance of interest and for the functional acquisition of skills. In general, skills are best learned in actual rather than mimetic form, and in functional combinations with a number of variations rather than in a single, set sequence. A method which makes clear to the player the use which the skill has in the game will most surely arouse the interest necessary for motivating

practice. The player should be led to share in the analysis of skills, to be cognizant of the laws at work in the successful execution of the skill, and thus to assume a large measure of self-direction and intelligent criticism of her own performance rather than merely to memorize or imitate.

Tests of Skill

The use of tests as a means of diagnosing weaknesses and of measuring accomplishment is effective. The danger in using tests is that they are frequently made to stand as ends in themselves. The passing of the test, like the earning of a symbolic award, obscures and even replaces the very purpose for which the device is used. A safeguard against this result is again the enlistment of active responsibility on the part of the participant. If players are given opportunity to analyze the procedure and comprehend the function of a test and further to share equally with the teacher in its administration, the danger of treating it as an end in itself is greatly reduced. In the simplest test, as in the most highly standardized, participants should be led to judge the test by the invariable criteria of validity for testing what it purports to test, and reliability and objectivity in doing so. The main value of tests is the impersonal and relatively permanent record they afford of failure or accomplishment. This value is lost unless both the process and the results are intelligible to the person tested. The selection and administration of tests becomes a method of teaching not only skills themselves, but other concomitant values such as respect for scientific evidence, understanding of the meaning of objectivity as contrasted with personal judgment, and accuracy in following out a logical procedure.

Related Games

The sequence of games played by a group or arranged as a long-time program in athletics should serve the two purposes of being immediately interesting and appropriate and having a relationship between the games which leads to increasingly high and complex skill. No game should be selected merely as practice for another game. Any game played must be worth playing for its own contributions to the player at the time. But this specification does not rule out the possibility of planning progressions or of making choices between games in terms of the carry-over of skills. The precise choice of a sequence of games must be dictated by the conditions of a given program, particularly by the kind of opportunity for play most universally and continuously available.

Group Practice

Ideally all skills should be so taught that instruction is individualized to take account of special aptitudes or weaknesses in each player. This being nearly always impossible, group practice must be substi-

tuted and those skills or elements of skills which can safely be practiced in mass style so organized. An accurate analysis must always be made of the phases of a game which lend themselves to such instruction. Actual game conditions must as nearly as possible prevail. Under no circumstances should an artificial substitute which fails to duplicate essential game conditions be made. Therefore, while all games lend themselves in some degree to this procedure, only those elements and phases of a game which can be practiced accurately in large groups should be presented in this way.

Visual Aids

The visual counterpart of a skill, such as a photograph or moving picture, and the graphic representation of tactics and strategy should be used to supplement verbal explanation and actual demonstration of skills. The learning of skills involves both vision and kinesthesia. It intensifies and often clarifies the process to dramatize it in graphic form. In this as in other methods of instruction, the player should share in the use of these devices by inventing, criticising, and contributing to the use of visual aids. A combination of experiences in which the player devises a graphic representation of a skill she possesses will achieve more than the mere passive attendance upon a demonstration prepared for her.

**The Acquisition of Skill Must Be Promoted
by Using a Wide Variety of Sound, Effective
Methods Employed Always as Means
to an End.**

Health Safeguards

Safeguarding the health of players involves supervision and control of the health of the player herself, of the environment in which she plays, and of the manner in which play goes on.

An accurate measure of the player's health status when she enters the program and during her participation in it is a first essential of any well conducted program. The best measure of health status is an initial and periodic health examination by a qualified physician. Such examination includes the taking of a health history. Vigorous play is itself a means to health, but it becomes a menace to health when the player possesses defects of an organic character. Not only is a reliable health examination and a regular check-up a requisite for participation in athletics, it is also the occasion for health education of a kind especially available through athletics. The examination should never be either routine or unintelligible to the player being examined. As in all the phases of participation, she should be actually a participant in the evaluation of her own health status.

Classification for fitness to participate based on a health examination should be as individualized as possible. The routine practice of grouping activities into classes and giving A, B, or C health ratings to correspond with these classes of activity, is inferior to a more careful analysis which takes into account the amount and kind of participation in view, and the compensatory factors present in the health picture of any individual. Swimming, for example, may be so utilized that it serves therapeutic purposes for persons of very deficient health status; on the other hand, engaged in as an expert competitive pursuit, it may tax the physical resources of the most normal participant. The quality and extent of participation is a safer guide to classification of activities than is mere type. So also are individual differences of physique, previous health history, temperament under stress, age, and a number of other affective elements of health, a better basis for classification of fitness than is mere organic normality.

Participation in Athletics Must Depend Upon a Comprehensive and Reliable Evaluation of the Health Status of the Participant; and Upon a Classification of Fitness Which Takes into Account the Quality and Extent of Participation as Well as the Type of Activity, and Individual Differences as Well as General Organic Normality.

Present evidence indicates that such special health considerations as restriction of activity during menstruation should be determined by individual differences. The same evidence points to certain general, universal restrictions to be observed for all players. The restriction against intensive competition during menstruation should be maintained. Wherever reliable judgment of individual differences is lacking, a conservative rule regarding any very active or sustained participation in strenuous activities should be followed.

Special Restrictions upon Participation, such as Participation during the Menstrual Period, Must be Determined by Individual Differences, with Conservatism, in the Absence of Final Evidence, as the Rule.

The environment for play should be planned and serviced hygienically. This includes ventilation, sanitation, lighting, the arrangement of play space and equipment for play, and the arrangement for dressing

and showering before and after playing. The person charged with supervision of the plant and equipment should be conversant with scientific specifications for these arrangements and should be able to recognize defects and advise remedies. Players should be expected to share responsibility for the proper use of the plant and facilities, encouraged to use resourcefulness in substituting for facilities which may be unavoidably lacking, and encouraged to take pride in a hygienic mode of behavior in relation to play.

In addition to proper classification of players' fitness to play and proper provision and supervision of the environment for play, the conduct of the program demands health safeguards in the matter of training and scheduling of activities. Training as a means of adjusting to the physical demands of strenuous participation should be gradual and continuous. The scheduling of activities should take into account the suitable length of time of any one play period and the intervals between play periods. A plan involving regular periods of limited length at frequent intervals, scheduled to occur out of doors whenever possible, and at times of day when vital energy is at a high level, is optimum. Under no circumstances should participation in athletics be allowed to interfere with other phases of the health regimen such as rest, regular meal hours, and the like. Play should produce healthy fatigue followed by rest; it should never lead to exhaustion.

The Program Must Be Scheduled to Conform to an Optimum Plan of Regular Play Periods of Limited Length at Frequent Intervals Held out of Doors Whenever Possible and at Times of Day When Vital Energy Is at a High Level and When Interference with a Hygienic Regimen Is Not Entailed.

The costume for play should, if possible, be used only for this purpose. It should be simple and appropriate to the activity, conforming to standards of good taste, and such that it can be easily laundered. Costumes designed to attract attention either by their departure from good taste or their conspicuousness are inappropriate. The player should in this respect as in all others be educated to make intelligent choices based on use.

Organization of Competitive Activities

The element of competition, present in all organized group play, should be treated as the most constructive factor in the experience of the player. Activities should be organized to allow the free and fair operation of the competitive factor, and to prevent its destructive or

one-sided effects. The outcomes of competition are determined, not by what is played, but by the way it is played. There can be no hard and fast classification of activities or even of the organization of activities which will guarantee desired results. The common distinction between intramural as a safe organization of activities, and inter-team or inter-institutional as unsafe does not hold in the face of facts. All of the vicious aspects of competition may be present in the most circumscribed scheme of play. Correspondingly, local factors may make it both sensible and desirable to organize competition with outside groups, even at some distance from home territory. The only fixed guides to constructive competition are that the program of athletics shall offer equal opportunity to all in terms of individual ability, that it shall be wide in range rather than centered in one activity, that it shall be adapted to the needs and interests of the participants in every respect, and that it shall be honestly and expertly led.

**The Element of Competition, Present in
All Organized Group Play, Must Be Made
to Function as the Fundamental Construc-
tive Factor in the Athletic Program.**

Equal opportunity for all players in terms of individual ability implies a broad base for competition, providing opportunity beginning at the novice level. It means that expert leadership and skillful coaching will not be reserved for star players, but that on the contrary every resource of teaching will be drawn upon for the job of instruction in fundamentals. It is in the initial stages of learning a game, especially a game of complex skill, that basic habits both of motor coordination and of attitude and interest are laid down. From this broad base, every player should be led to carry skill as far as individual aptitude and persistence allow. This means that there will not be some point at which interest in developing experts will stop. There is nothing in the creed of education through athletics which rules out the expert. There is no defensible reason why an educationally designed athletic program should either fear or fail to develop the maximum skill which an individual may possess. A well conducted program of athletics will provide for the whole range of skill. This will be true not only in the matter of the leadership and coaching provided, but in the provision at every level of skill for competition between equals. There is nothing educationally admirable in the situation of the comparative dub pitted against the highly skilled player. Unequal competition or competition held down to a level misconceived as safe because it is too inexpert to be intensely exciting is educationally as senseless as competition only for star players. Here again no artificial control of competitive play will

insure desirable behavior or desirable outcomes for players. Poor players or mediocre ones can be quite as unsportsmanlike as experts. At times the very lack of skill may make for repeated violation of rules and for a substitution of force for subtlety in the manner of playing. The novice, the average player, and the expert have equal rights to opportunity for instruction and for competition adjusted to their abilities in any well conducted program of athletics.

**Provision Must Be Made in Equal Terms
for All Players to Participate and to Com-
pete in Terms of Actual Ability and Maxi-
mum Expertness.**

Wherever there are candidates enough to form more than one team, intramural play should precede in due proportion any type of inter-school play. By this means, equal opportunity is best ensured and the temptation to concentrate effort on a selected group of more expert players better avoided. Where inter-institutional or inter-team play is engaged in, it should conform to the same standards of common sense, good faith, and educational control that rule any civilized encounter between groups of people. The presence in athletics of an exceptionally explosive type of competitive element makes it necessary to take special care that these conditions shall prevail. The best protection against displays of unsportsmanlike behavior when playing against outside competitors is the establishment of clearly defined habits of behavior in play under less provocative conditions. A team which resorts to illegal tactics or whose members lose their poise and self-restraint when away from home will very often be found to have been made susceptible to such conduct by previous poor leadership. Again it must be said that local conditions and a variety of factors about which it is unwise to generalize will determine how players behave in competition. If there were no problem, if competition were an indifferent matter, or if players possessed no emotions about the outcomes of competition, the educational possibilities of athletics would be reduced along with the dangers. The opportunity for leaders to guide through the direction of strong feeling and for players to make choices under stress is the core of athletic experiences. This characteristic of competitive play makes education through athletics possible and makes ethically imperative the discharge of the full educational responsibilities vested in those who control athletics.

One aid in ensuring a well conducted competitive program is the utilization of the many methods of organizing competition. Any standard text on athletics will provide directions for organizing such types of competition as ladder, round robin or percentage, elimination, and

consolation tournaments. There are a variety of kinds of meets which lend themselves, not only to track and field events in which they customarily take place, but to any standard competitive game or sport. Playdays in which teams are broken up by an interchange of players thus reducing the competitive element, or sport days where teams are kept intact, may be organized to provide a day's competition conducted on a cumulative point basis and involving many sports. Sports days where several teams, kept intact, compete in one sport for a cumulative point score by which one school or group wins or loses, are also useful.

On the inter-team or inter-institutional basis, telegraphic meets in which scores are compared by wire, and invitational meets involving the coming together of teams, may be used. A scheme of organization such as a league or series, in which a succession of scheduled contests is held offers the most intensive type of competition. The repeated encounters and the intense interest in final events in the series build up correspondingly strong feeling.

No one type of competitive organization may be designated as the approved form. Any or all of the common types of organization have their appropriate uses. In any scheme or organization, the criterion will be the success with which the possibilities and dangers of the situation are foreseen and utilized. The difference between a single amateur game between fellow players and the most critical of final contests in a series is one of degree, not of kind. In the well conducted program of athletics, those types of organization which will yield the greatest number of desirable outcomes will be the ones selected.

**The Method of Organizing Competition
Must Be Determined by the Desirable Possibilities it Provides, Not by the Type into Which It Can Be Classified.**

Officiating

The official is the person who holds authority at the most crucial stages of competitive play. This fact makes it imperative that she be qualified, personally and professionally, in the strictest terms. She is the leader at the point where unforeseen situations can arise without warning. She decides the issues which are the culminating form of every interest which players have in the game. She is exposed to the criticism of both sides, and to that of any audience that may be present. She must therefore command the respect of participants and spectators.

The minimum preparation for officiating is a thorough knowledge of the rules and regulations governing play. Unless these are so well mastered that they can be automatically applied, the official will fail to meet the necessity for instant judgment. In the split second in which

she hesitates about a decision, or in the sense of insecurity which she will feel if she has judged incorrectly, her status will be endangered and her own confidence shaken. One means of habituating rules and regulations is to play the game.

This will give the official not only direct practice in learning rules but also a first-hand sense of the participant's point of view. Certification of ability to officiate under the Officials' Rating Committee of the National Section of Women's Athletics is the best assurance for the official herself and for those who play under her authority that she is qualified. The Rating Committee is organized on a regional basis, making possible the taking of these tests in almost any section of the country.

It is good practice to place women in official control of girls' and women's games. It is obvious that the difference in standard rules for men and women will handicap men officials. It is usually impractical for men to participate in the women's form of a game. Moreover, men are less certain to be aware of special considerations such as health safeguards which may enter into the management of a woman's game. But here again an invariable rule cannot be set. It is manifestly more desirable to engage the services of a competent man official than to allow a game to be run badly by a woman. Under present conditions, there are comparatively few situations in which a competent woman official cannot be secured if the effort is made. Therefore, the use of men officials for women's games is justifiable only under exceptional circumstances, and then only when the man measures up to the qualifications set for proper officiating.

Alertness, accuracy, and impartiality are the indispensable qualities of good officiating. In addition, the official should wear clothing appropriate to the activity and designed to distinguish her from the players. Her conduct before, during, and after a game should be such that she is in a position to sustain any challenge to her authority. She should regard her task as one of leadership with all the responsibilities which leadership entails.

The Official in a Contest Must Measure up to All of the Qualifications Set for Leadership, that is, Her Exercise of Authority Must Be Sound, Consistent, and Expert.

Official Rules

Official rules for many types of games, including highly organized athletic sports, are issued and frequently revised by the Women's Rules and Editorial Committee of the National Section on Women's Athletics. These rules comprise not only the most approved plan for

playing a game but they are also constructed to make the game most interesting and workable. The formulation and revision of these rules are based upon expert judgment and upon wide experimentation in every type of athletic program. In view of this fact, any objection to the restrictions which they impose upon play may be fairly suspected of being subversive. These official rules are designed to make the game safe and satisfactory to players; they are not designed to make the game an effective exhibition for an audience. They allow ample range for the exercise of high skill and ample opportunity for challenge and excitement in play. They are available at minimum cost in every part of the country. The use of any but these official rules is incompatible with the well conducted athletic program.

Where local facilities make it impossible to meet the specifications of space, equipment, numbers, or other arrangements called for under official rules, a wise modification in these rules should be made. Under no condition is it justifiable to modify rules in such a way that the protective restrictions which they impose are violated. If a game must be played badly, it should not be played at all. Modification of rules may be necessary. It should always be undertaken by a qualified leader and in such fashion that the game still conforms in essentials to the standard form.

The Official Rules Authorized by the National Section on Women's Athletics of the American Physical Education Association Must Be Used.

Incentives and Awards

The interest in earning a tangible symbol of success is common to many life situations. It is peculiarly characteristic of competitive play. The degree to which this is true is due in some part to the widespread practice of associating awards with athletics. Not only has the practice of giving awards been carried beyond reasonable limits; it has also been let to function as an end in itself. It is doubtful if many players actually play in order to win a pin, a banner, or even a more valuable prize. But the centering of attention and the dramatization which often attends the bestowing of awards can make this moment seem like the climax of the experience. It is a characteristic of maturity in any area of life to be increasingly independent of the need for tangible awards. With maturity, the person chooses to invest his energy and skill in a pursuit because it gives him continuous and commensurate satisfaction. He ceases to require symbolic evidence that he has succeeded; rather he judges success in the terms of the activity itself or in the approval of his colleagues. Athletic programs, especially those involving

young persons, can contribute materially to the psychological and social maturation of the participant. Therefore it should be the aim of the leader to provide for the progressive education of the participant away from the need for tangible awards. Adequacy, the exercise of skill, fairly won superiority over an opponent, should be the sources of interest in play, not the struggle toward the moment when a badge or a blazer may be won and worn. Under no circumstances is it educationally justifiable to mislead players by holding out to them the earning of awards with monetary value. The rewards of play have nothing to do with material gain. Valuable prizes are as out of place in an athletic program as would be pay for playing. Even group awards, designed to minimize the emphasis of the individual, are no great advance over the more personal symbols. Symbolic awards for individuals and teams have a legitimate place as incentives where the need for them is real and not induced, and where no more intrinsic satisfactions can be immediately substituted. But the line of direction should be not toward higher and finer awards for more expert play, but toward less and less dependence upon tangible symbols of achievement.

Point systems, in fairly common use among school programs of athletics, are subject to the same weaknesses as are badges, or plaques, or other more costly awards and incentives. Here again is need to recognize the difference between means and ends. It may be advisable or at least justifiable to adopt an impersonal means of artificial stimulation. The decision rests upon a sound estimate of the factors in the given situation. Progress toward independence of the need for such schemes for motivating participation or recording accomplishment should be the aim.

Athletic associations in connection with agencies sponsoring athletic programs are frequently the means for sharing with participants the responsibilities of leadership. This should be the aim of their establishment. The method of organization should be adapted to the local situation. Once organized, the association should be given definite responsibilities and be guided in acquitting itself of these. The association should give to its members the satisfaction of belonging to a group having common interests and the sense of sharing in the making and maintenance of wise policies for athletics. It should never be allowed to degenerate into a privileged body or to become entangled in the political manoeuvrings which may be taking place in the institution to which it belongs. This latter danger is greatest in colleges and universities where student organizations enlist support for the group aggrandizement they afford. Athletic associations should make efforts to connect themselves with similar organizations in other institutions, and should feel that they are part of a broad aggregation of groups representing student or participant leadership in athletics.

**The Athletic Program Must Progressively
Educate the Participant Away From the
Need for Artificial Incentives and Tangible
Awards.**

THE LEADER

Leadership in athletics is a common responsibility of all persons who exercise any type of control over the way an activity is carried on. It begins with the administrator who holds ultimate power. It falls most directly and continuously upon the teacher who actually conducts the activity. It extends to the most temporary leader who directs his side or captains his team in a contest. Whenever a choice is made in the way things shall be done, leadership takes place on the part of the one who predominantly influences that choice.

To lead entails assuming an obligation toward those who are led. The leader is obliged to accept the consequences of his leadership. If an administrator, acting from behind the scenes of play, creates conditions in which gate receipts outweigh the values of the play itself, he is liable for the subversive effects of commercialization. If a teacher undermines the ethical code of fair play by devising tricks and subterfuges, he is liable for the long-time outcomes of his teaching. If a captain countenances cheating or a squad leader approves evasion of the rules, the obligations of leadership have been ignored although the consequences for leader and led still stand.

Therefore, to be constructive, leadership must be *sound*: that is, it must be determined by the good of those led. It must be *expert*: that is, it must be based upon knowledge of what to do and mastery of the way to do it. It must be *consistent*: that is, it must at all points, for all persons, and under all conditions, adhere to a single set of justifiable values. The captain who restrains his team from replying in kind to unfair opposition exercises sound leadership. The administrator who understands the educational significances of athletics and establishes conditions where these may be realized instead of thwarted, exercises expert leadership. The teacher who makes no exception of a critical game in a competitive series but holds to the same stipulations in matters of health and conduct under crucial as under casual conditions, exercises consistent leadership.

**Leadership, to be Constructive, Must Be
Sound, Expert, and Consistent.**

THE ADMINISTRATOR

The difference between the administrator and the teacher as leaders is one of kind, not of degree. The administrator who may never see the game played is nevertheless finally accountable, through his control over the teacher and over the conditions of play, for the values

the game yields. His role is unique, but his obligation is identical with that of all persons determining choices for others. This is true whether he administers the most traditional of educational systems or the most incidental of competitive situations. He may be the head of a school board or the manager of a sporting goods factory. So long as people play games under conditions within his power to control, he is the final arbiter of what happens to them. Administrators ordinarily carry out only the initial, general procedures under which athletics are conducted. Beyond this, delegation of responsibility becomes the means to the administrator's ends, but the ends remain his no matter how remote from his immediate control may be their execution. Therefore, the assumption of constructive leadership through the administration of athletics means that the administrator sets the purpose, selects and empowers the direct leader, provides and supervises the facilities and equipment, oversees the general conduct of the program, and controls the public relations between players and audience.

Determination of Purpose

The modern athletic program is an outgrowth of simple and spontaneous play activities. Originally these games were played informally without any thought of audiences or gate receipts. Trained adult leadership was not essential because the quality of competition was not high and the play was complete in itself. Recent years have seen not only striking developments in the scope and intensity of athletic activity but also in the related aspects of commercialism and publicity. In many cases the game belongs far more to the backers or to the audience than it does to the player. The organization has become so complex that the administrator can no longer stand off and watch disinterestedly. He must make it his business to be informed about contemporary developments in order that he may state definitely the purpose of the program for which he is responsible. The desire of any local community for athletic fame abroad should never be allowed to alter the underlying purpose. The natural loyalty of alumni to a school or the desire of a business man to sell his goods should not be permitted to bring subversive pressure upon an athletic team. For these reasons it is important that the administrator make a clear statement of the underlying purpose of athletic activity and then provide for its continued practice.

The Administrator as a Leader Must Be Responsible for the Realization of the Purpose for Which an Athletic Program Is Conducted.

Delegation of Authority

It would be impossible to enforce this underlying purpose without definite delegation of jurisdiction and authority to properly equipped teachers. Translation of objectives and detailed conduct of the program are duties of teachers who are working directly in contact with girls. The immediate goal of the administrator is to select teachers wisely and to transmit authority honestly, clearly, and unambiguously.

The athletic program in a school is educational when it is under the direct control of the school administration and not under any outside authority. The line of responsibility goes from the superintendent to the principal to the physical educator, with the supervisor of physical education working cooperatively. Groups such as alumni or parent-teacher organizations may be very helpful in athletic situations but they should never decide policies or interfere with the conduct of the program. The girls' athletic program in a school is a part of the educational scheme and should always be under the leadership of trained educators.

In non-school organizations the problems of administration may be more complex because of the lack of centralization and also because the factor of voluntary participation often leads to loose group organization. These elements present a distinct challenge to leaders of non-school groups who must hold themselves responsible for maintaining high standards and for conducting a wholesome balanced program. It becomes the duty of the administrator to establish the purpose of the program and to ensure its effectiveness by employing responsible, trained leaders.

Athletics should always be thought of as an essential part of a physical education program. Authorities agree that when athletics become isolated they are more prone to exploitation and commercialism. A good total physical education program gives stability and guidance to athletics. In a school, athletic activity should be a part of class work in physical education and the after-school program for the most part become an outgrowth of this work. In the non-school situation, a physical education program provides more opportunity for larger numbers of girls and minimizes prominence for a selected few who are particularly skilled.

**The Administrator as a Leader Must Ensure
the Accomplishment of His Purpose by the
Selection of Properly Qualified Teachers
and the Honest Delegation of Authority to
Them.**

Provision and Supervision of Facilities and Equipment

The administrative leader should provide, in so far as it is possible, the best facilities for the greatest number of people in diversified activity. He should consider both indoor and outdoor activity. He should consider the scope of a modern program that is based upon the needs, capacities, and interests of the participants. He should make use of all available expert knowledge and of the best current practice in planning facilities and equipment. Having ascertained the facts, he should make it his further responsibility to interpret to the properly constituted authorities any needs for additional facilities, and to work consistently toward such ends.

If adequate facilities are not provided within the institution or agency, it is necessary to survey the community for additional facilities which may be rented or borrowed. In return the administrative leader should make his facilities and equipment available to responsible outside agencies at all hours when they are not actually in use. Any natural resources of the community should be taken advantage of and promoted, such as park reservations, lakes, and community play areas. All athletic play areas should be kept in good condition and maintained in accordance with the dictates of health, safety, and enjoyment. This maintenance involves primary consideration of the participant but it also includes the spectator. It is the responsibility of the administrator to provide proper background for athletic activity and to enforce any necessary regulations for audience comfort and control.

The Administrator as a Leader Must Provide and Supervise a Physical Setting for Athletics Which Conforms to the Educational Character of the Activities.

Overseeing the General Conduct of the Program

It is not expected that the administrator have knowledge of all details of the athletic program, but there are certain debatable questions about which the administrator should have a definite point of view. The more important of these are here indicated briefly.

Scope of the Program.—A good athletic program includes different kinds of sports, selected because of their relative importance and value to the individuals participating. The primary factor in selection is a consideration of individual capacity and interest but other factors

include traditional community attitudes and practice, seasonal value of activities, natural local environment, and facilities. It is important to include team sports, and also sports like tennis and swimming, which may be carried on individually or in small groups. Partner games are apt to be more practical for leisure time training because the situation for participation is easier to arrange. The athletic program as a whole should be varied, balanced, wisely selected for individuals, adapted to the local situation, and designed for the largest possible number of participants.

Health Safeguards.—Good activity involves not only the immediate enjoyment and satisfaction of participation, but also the general welfare, health, and safety of the group. Health regulations and medical supervision are in the hands of experts, but the administrator makes due provision for them.

Classification of girls for athletic purposes should always be based upon knowledge of their physical condition and health history record. Periodic and systematic examinations should be made by reputable physicians and in the case of strenuous activity involving younger girls it is advisable to have parental consent also. In a non-school situation, especially when older girls are participating, it is even more important to have careful examinations than in school.

Actual conduct of the athletic program should promote the practice of desirable health habits. Periods of gradual training, preceding participation in strenuous sports, emphasize the fact that training is an integral part of the whole experience of participation. Athletics should be conducted according to appropriate seasons of the year, without interference with a hygienic regime, and whenever possible out of doors. The costume for activity should be simple and appropriate, conforming to standards of good taste, and providing sufficient warmth for outdoor play. It is especially important to change clothes before and after activity. A shower after activity should become an accepted procedure with adequate provision made for this. Guidance of the individual participant should include not merely the practice of health measures but also the more positive interpretation of these measures so that they become personal and meaningful standards.

Participation in athletics during the menstrual period should be guided by knowledge of the nature of the activity, the physical condition of the girl, and her health history record. There is, however, so little known of the detailed physical condition of individuals that a guide for group procedure will be reasonably conservative.

Degree and Type of Competition.—There are several criteria by which to judge the quality of planned competition. First, there must be well-matched opponents—an approximate equality of ability and experience, so that the contest will be on an interesting basis and its

outcome in doubt. Occasionally it is stimulating to play against a very superior opponent but it is not wise to plan such competition often. The second criterion involves continuity of participation rather than short, sporadic periods of activity. It is much better to spread out effort than to center it on one important game or contest. The third criterion considers the effect of competition upon the participants. The goal of athletics is not to find the "best" team or player but to give opportunity and pleasure to all participating. Therefore, it is the duty of the leader to plan competition around this end, and to find a type of competition which does this for the particular situation. In many schools the interscholastic athletic program for girls has been replaced entirely by an intramural system. The reason for this was to provide better competition for larger numbers of girls and to take away the undue importance of small "varsity" groups. It was a practical measure to promote more athletics and does not indicate that the interscholastic system is any better or any worse than the intramural system. There is no standard system for all situations. The final criterion of good competition—both in schools and out—is whether it stimulates increased numbers of participants, whether it promotes their continued interest and actual play, whether it includes opportunity for all girls within the group, and whether it promotes a friendly spirit among competitors.

Incentives, Awards, and Measures of Accomplishment.—

Awards of intrinsic value are apt to overemphasize the winning of the game. Awards of little monetary value such as "letters" or certificates may be of local value in kindling interest and recruiting more participants, but even the most worthless award can detract from the value of the game. The danger lies not in the award itself but in the emphasis placed upon its status. The point system which assigns numerical value to athletic accomplishment may be helpful in certain local situations when it is used as a device to stimulate participation, but it loses its value if it becomes too intricate or if it replaces intrinsic interest in play.

There are available a number of tests of varying worth in predicting athletic ability and measuring accomplishment. Such tests are valuable if they are easily administered and have meaning to the player. Much scientific experimentation is being carried on and the administrative leader should adopt the same attitude toward tests in the field as he does toward measurement in the fields of psychology, physiology, and general education.

Financing the Program

Both in the school and in the non-school situation, the athletic program should be financed by the promoting agency and not used as a source of financial income, dependent upon gate receipts for its exis-

tence. When the promoting agency does not assume total financial responsibility for the athletic program as a part of its educational and recreational policy, gate receipts become a dominating factor. If the revenue is large it becomes dangerous because commercial exploitation may dominate athletic activity. On the other hand, there are many situations where admission to games is the means of promotion. There is no standard policy which will cover all situations. In general, athletic programs function best when there is no admission charged for contests and when the entire financial responsibility is borne by the promoting agency. If gate receipts are necessary, it is the duty of the administrator to see that they are a means of promotion and not an end in themselves.

**The Administrator as a Leader Must Act
as Final Authority over the Important
Phases of an Athletic Program Such as
Health Safeguards, Degree and Type of
Competition, and Method of Financing.**

Public Relations

Good publicity may be used in promoting the athletic program. The layman's interest, appreciation, and support of the program are a desirable community expression. Proper promotion and wise publicity are direct concerns of the administrator, although he should work with his teaching leadership in this respect. The program itself should be its own best publicity. A planned program of publicity is advisable to present interesting information concerning the program, its standards, aims, and outcomes. Daily newspapers, school or organization news-sheets, and occasional bulletins or posters can be used. Definite steps should be taken to enlighten audiences. The administrator can do much to prevent an undesirable audience by advance publicity, by seeing that careful explanation of all happenings is made at the time of the game, and by following up events with planned educational material.

Constructive publicity stresses the significant achievements of the group and good points in the program, rather than the idiosyncrasies of star players. It stresses the purpose of play rather than the winning of championships. It is continuous, keeping the program before the public. It is varied in appeal in order to reinforce points without monotony and to reach all possible agencies. Publicity should be a cooperative enterprise between the sports leader and the journalist. The leader supplies interesting news and the journalist is gradually led to see more educational implications and to stress the democratic aspects of athletic participation. It is the business of the leader to foresee

and to guide this development. The level of interest of different readers of publicity should be kept in mind. Statements of standards and principles should be made by the indirect approach, through interesting news stories. Constructive publicity considers the best interests of the participants, not just the curiosity of readers. Publicity is more than the reporting of events. It aims to develop a sound public attitude, an understanding of goals, and an appreciation of the welfare of players.

**The Administrator as a Leader Must Be
Responsible for Reflecting in the Public Re-
lations Accompanying an Athletic Pro-
gram, the Character and Purpose of That
Program.**

THE TEACHER

The teacher or coach is the connecting link between the administrator and the girl who is playing the game. She is the person who deals directly with the girl and is responsible in a large measure for what happens to her through athletics. For this reason she must know the standards set for the administrator and for the girl and must be able to see her own actions in relation to each. The teacher or coach is helped or handicapped in her work to the degree in which the administrator has the understanding and ability to control the conditions under which the athletic program takes place. Often it is necessary for the teacher to interpret the needs of the girls to the administrator and to educate him about the part athletics play in the health and happiness of girls. Other things being equal, a woman should be the leader of girls, for she is by nature better equipped to understand their individual needs than is a man. Too often one thinks of teaching and the responsibilities of teaching as limited to the typical school situation of teacher and class, which represents only one place where teaching and learning occur. Teaching and learning go on wherever there is anyone leading and anyone being led. In fact, it is quite possible that there can be peculiarly effective leadership in an out-of-school situation because of the freedom from such artificial forces as grades, from fear of the teacher on the part of the girl, or from fear of losing her job on the part of the teacher. Preparation for leadership must be consciously made. The idea that leaders are born and not made is only partly true. There are certain fundamental qualifications for teaching or coaching athletics which can be analyzed and acquired by those who want to be good leaders.

Professional Qualifications

The leader is qualified to teach because of her own professional preparation for the responsibilities of teaching as well as her own personal qualifications. A sound professional background for the leader or teacher of athletics includes a comprehensive general education, a scientific foundation in health education, and a technical knowledge of the theory and practice of athletic activities.

There are certain things every leader should know. She should have a thorough understanding of games, both as to rules and strategy. She should have a sound basis for selecting certain games or athletic activities on the basis of their suitability for girls, that is, activities adapted to their level of skill, interest, and strength. She should know how to plan a graded, progressive program of activities. She should have information at hand which will give her an accurate understanding of the individual needs of the girls who are participating in the program. The greater the skill the teacher has in the playing of games herself, the better. As a minimum, one might say that she should have sufficient skill in the activity itself to be convincing in teaching.

The leader's philosophy, beliefs, or attitudes toward the conduct of the athletic program are most important and are the real evidences of good professional preparation. She should be interested in providing opportunities for *all* girls to play games and not just in coaching the star athletes who are the easiest to teach. She should give the joy and satisfaction inherent in physical activity a chance to develop, and not depend on material awards or the winning of games as the girl's chief incentive. She must realize that any participation which endangers the girl's health is unjustified. She must constantly keep in mind the necessity of medical examinations, be ready to limit the activity for girls who need it, and control the sanitary and safety features of the gymnasium and playfield. She must realize that any unfavorable publicity which comes through inappropriate costume or behavior of the girls shows her lack of professional standards; that girls' rules are made to adapt the game for girls; that women officials should be used whenever possible and that she should help to train better ones; and that she must take the initiative in the promotion of desirable standards and in solving problems that arise in the leadership of any athletic program.

The leader must realize that her own conduct on and off the playfield reflects her professional qualifications to lead. She should measure up to the standards set for the participant. For example, players are told that they should not dispute the referee's decisions, and yet in a close decision the coach will sometimes be the first to criticize the official in front of the players. Such failure to practice what she preaches invalidates her leadership.

A leader who is wholeheartedly interested in the profession will

keep up to date with current literature on athletic problems, take advantage of opportunities for research, and be alive in general to all modern developments in the field of athletics.

**The Teacher as a Leader Must Command
the Facts and Have Mastery of the Tech-
niques Which Function in Athletics.**

Personal Qualifications

Because of the influence that example has in unconsciously or indirectly affecting the habits and attitudes of the person being led, the teacher or coach has a definite responsibility to appraise her own personal qualifications. Because of the hard work and physical demands involved in teaching athletics, the leader has to consider carefully whether she has the physical strength and endurance to undertake the responsibility. The leader should have the ability to stay on the job consistently without numerous interruptions because of illness. Strength and endurance are qualities of a good leader. She must be able to attack each new day with a freshness of spirit that is impossible unless she is strong as well as healthy. Enthusiasm for teaching athletics depends on two factors—an honest liking for athletics and a real interest in people. A leader must understand and be interested in the variabilities of human nature and must believe that athletic games have value.

The leader should be emotionally mature. She should, in other words, have achieved personal independence and confidence in herself, ability to act with reference to the welfare of others instead of acting chiefly for her own satisfaction. She should be free from any necessity of masking feelings of inferiority and insufficiency by dominating others, by making others emotionally dependent upon her, by blaming others for her own shortcomings. She should be strong enough and confident enough to be honest and truthful, no circumstance ever driving her to even the subtler lies and dishonesties. She should enjoy real life situations genuinely, and receive enough personal and professional satisfactions from every day pursuits to avoid any temptation to excessive day-dreaming. She should have the constant habit of tackling new and difficult problems with intellectual honesty and without self-pity. She should be able to think and understand other people in the circumstances of their own lives rather than in terms of her feeling towards them.

A leader must be natively endowed with a certain capacity to think about complicated and fairly subtle issues. She must have enough innate mental ability to think in terms of principles, programs, objectives, and educational outcomes rather than only in specific concrete terms, such as winning of games, mere temporary enjoyment, avoiding physical

injury, and pleasing individuals in the community. Being endowed with sufficiently high general intelligence, she must then have built up during her lifetime habits of industry, techniques of verifying her thinking, a love of mental activity, and a fund of information sufficient to insure her constantly living up to the level of her capacity.

A leader should show consideration for the rights and feelings of others. To be sarcastic, rude, and overcritical often hurts other people's feelings and does not show the proper respect for another's personality. Having good manners implies putting other people at their ease. A good leader is able to control her feelings and emotions. She does not lose her temper, become afraid, or get unduly excited when difficult or unexpected situations arise.

The leader should be fastidious in her personal hygiene. Her hair should be well cared for and becomingly arranged, her dress appropriate, neat, and attractive, her general appearance well put together and agreeable to others. The leader should demonstrate in herself the principles of good body mechanics. It is important for a leader to speak clearly, effectively, and easily with a voice that is pleasing in pitch and quality.

The Teacher as a Leader Must Herself Exemplify Those Traits—Physical, Mental, Emotional, Social—Which She Seeks Through Her Teaching to Inculcate in Others.

Results of Teaching

Results of teaching must be measured in terms of the development of the girl. There should be some evidence of increased knowledge, improved skills, better personal habits, and desirable attitudes on the part of the girl who is participating in the athletic program. Some of these learnings are direct and some come indirectly. The teachers, by being aware of the opportunities present, can often clarify general issues for the girl and help her make an association between what happens on the playfield or in the gymnasium and what goes on in life in general.

Even though methods of measurement are still somewhat crude at their present stage of development, every device which is known should be used. It should be remembered that the opinion of experts, even though subjective, correlates highly with the best tests. Even without benefit of tests, evidences of greater achievement on the part of girls should be found as the result of a well-directed program. Some of the gains which should be evident are:

The girl should have greater knowledge and skill in athletic games, with increased enjoyment in playing and consequent interest in continued participation.

The girl should have a better understanding of what factors influence health, good daily health habits, and a greater appreciation of the importance of feeling fit.

The girl should have greater resources, both as to knowledge and skills, for spending her leisure time in interesting ways, and better appreciation of the value of wholesome leisure-time activities.

The girl should show increased power to handle herself in athletic situations which require courage and self-confidence, and should show a willingness to face facts realistically.

The girl should grow in her understanding of people and in her ability to get along with them. She should have more direct knowledge and appreciation of what constitutes fair play, telling the truth, cooperation, and respect for the rights of other people.

The final test of leadership is the degree to which there is an increasing amount of self-direction on the part of the person led. The player should show ability to organize her own games, to conduct herself naturally in difficult situations, to solve her own problems. Too often a leader enjoys the dependence of individuals or groups upon her and wittingly or not assumes and maintains the position of authority vested in her because of the personal satisfaction it gives her. A real leader is continually interested in training leaders by giving responsibility to others and by guiding their development rather than dictating what they should do.

Since the teaching relationship affects the whole personality of the girl being taught, whoever assumes the responsibility and opportunity of being a leader must look beyond athletic performance as her goal, and consider athletics as the means through which the girl can develop her mental, physical, and social self.

**The Teacher as a Leader Must Realize that
the Results of Teaching Are Desirable
Changes in Those She Leads, and Must
Appraise These Results by the Most Ob-
jective Means Available.**

THE PARTICIPANT

It is apparent in the foregoing sections that the real test of any program of athletics, either in selection and conduct of activities, or in the leadership of the administrator and the teacher, is in terms of the development of the girl. She must be the constant point of reference, which means that the success or failure of any athletic program depends upon the changes which take place in the knowledge, habits, attitudes, and skills of the participant. For a clearer understanding of the conflicts which the participant experiences, this section discusses standards from the point of the participant as they affect situations which concern her directly.

One of the first points to keep in mind is that the participant is concerned primarily with herself, that is, with what she is to get out of athletic participation. Her first impulse is not to consider the welfare of the group or to be interested in conditions which will benefit the majority. She is not interested nor able at first to take a long view of the situation. Those points of view belong to the trained leader. However, if the leadership has been good, one can hope to see changes taking place in the participant's attitude as she grows older. Some participants never grow up regardless of age, and twenty-five year olds are found engaging in athletics with the same limited interests as fifteen year olds.

VALUES AND OBJECTIVES FOR THE PARTICIPANT

The primary reason for engaging in athletics is for the sheer enjoyment of the activity itself and the feeling of well-being that comes with successful physical activity. Girls do not go out for athletic activity because it is good for them, but because they expect to have a good time.

A girl wants to improve in her ability to play a game. It is an inherent desire to want to be as successful as possible. For this reason a girl usually chooses an activity in which she already has some skill.

A girl wants to learn skills in new athletic activities if she sees that she will have an opportunity for using them in her leisure time. It is for that reason that swimming and tennis always rate high as activities girls want to learn.

The participant wants to have a test of her skill. Competition is a perfectly normal urge and to be interesting the competition has to be difficult enough to demand her best efforts.

The desire to be included in activities with other people, preferably her own age, is inherent and universal. The participant in athletics is satisfying this urge.

The girl wants to be approved socially. If participating in athletics is considered desirable by her associates, she will want to engage in them.

RESPONSIBILITIES OF THE PARTICIPANT

Granting that the opportunity for participating in athletics satisfies the girl's wants as she feels them, certain responsibilities should be assumed by the participant if the leadership all along the line is good. The learning process, however, is a gradual one.

Health Responsibilities

The periodic health examination should be looked upon as an index of capacity. It is a protection for the participant and not merely an administrative procedure. She should not dodge it, but should seek it.

She should choose to do activities that are within the limits of her organic capacity.

Participation in athletics during the menstrual period should be regulated by medical advice and the intensity of the activity. The degree of desirable participation will vary with individuals.

There should be some consideration of preliminary training and preparation for competition. The demands on the organic system will vary with the age and previous experience of the participant.

The participant should consider the hygienic aspects of dress and cleanliness. She should dress appropriately to the activity, and have habits of personal cleanliness both during and after strenuous athletic activity.

Skill Requirements

The participant should have a varied athletic experience so that she will acquire at least an average degree of ability in the common fundamental skills found in many games. To have ability in striking an object, dodging an opponent, throwing, running, and kicking means that as new games appear or are tried, the participant will have confidence that she can learn them relatively quickly. This increases enjoyment.

The participant should acquire sufficient ability in a variety of athletic activities so that she will enjoy playing any one of several games, depending on the facilities of the local community. In other words, she should have several resources for her leisure time.

It is very satisfying to be superior in skill in at least one activity. It increases self-respect and self-confidence and wins social approval. Highly skilled participants have to make a special effort to learn to respect the rights and feelings of other people, to be modest in victory and generous in defeat.

Attitudes Toward Competition

The participant should appreciate the importance of good sportsmanship, courtesy, fair play, and emotional control, and be able to incorporate them into her own conduct. She should understand that a keen desire to win is natural, but not the only reason for playing. She should come to appreciate companionship, her own growth in desirable personal traits, the satisfaction of a game well played regardless of who wins, and to admire skill in others whether it is demonstrated by team mate or opponent.

The participant should be able to look upon the game as a recreative activity engaged in for her own sake and not for the amusement or entertainment of others. She should be able to discriminate between educational publicity and sensational advertising.

The participant should be able to recognize her own motive for participation. Whereas awards in moderation are legitimate methods of stimulating interest, a system of material awards of monetary value or a highly organized plan for non-material awards tends to shift the motive from enjoyment inherent in the activity itself to work for the resulting award. The participant should be less and less in need of external awards as she grows up.

Leadership Responsibilities

The participant should come to understand the objectives and responsibilities of her immediate leader, of the responsible administrator, and to see her own objectives in relation to theirs.

She should assist in the planning of playdays, meets, and other athletic contests wherever possible and share the responsibility of making them successful.

She should understand thoroughly the duties of squad leaders, captains, managers, officials, and appreciate the fact that their services contribute to good management and cooperative effort.

She should understand the value of athletic associations, both local and national, as further opportunities to develop leadership and serve a larger group.

She should grow more and more to assume responsibility for leadership in athletic activities with younger and less skilled groups in her local community.

**The Participant Must Develop the Desire
and Habit of Playing in Terms of Her Individual
Needs and Interests.**

**The Participant Must Take Increasing Responsibility
for Her Own Health.**

**The Participant Must Equip Herself With
a Variety of Skills Sufficient to Provide
Present and Future Satisfaction.**

**The Participant Must Learn to Use Com-
petition Wisely as a Means to Enjoyment.**

**Every Participant Must Consider Herself a
Cooperative Member of the Group and
Also Regard Herself as a Potential Leader.**

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Ninth Annual Report of the Committee on Curriculum Research of the College Physical Education Association

Part III

Report of Subcommittee Four

By PROFESSOR FREDERICK W. COZENS
University of California at Los Angeles

FORMULATION OF STANDARDIZED ACHIEVEMENT TESTS

AS WAS indicated to you in the report for 1935, the attention of the committee this year was turned toward the formulation of test batteries to measure fundamental skill in various activities, including team games. Since progress in the formulation of tests of this type cannot be made rapidly, it is the hope of the committee that the association may be willing to allow it to build slowly (perhaps) but surely.

The study which the Committee wishes to report this year is one made by Professor Stanley E. Borleske of Fresno State College. Though the study is entitled, "A Study of the Achievement of College Men in Touch Football," its primary purpose was to set up a short battery of tests to measure ability to play the game.

While the chairman of Subcommittee IV directed the study and has written this abstract, full credit for the project goes to Professor Borleske.

ELEMENTS COMPRISING TOUCH FOOTBALL

A judgment was obtained from a group of forty-six physical education instructors in the San Joaquin Valley as to the elements contained in the game. The composite judgment of the forty-six men gave a final classification with objective tests as follows:

1. *Passing*.—Center pass for kick; center pass for run; forward pass for distance; forward pass for accuracy; forward pass for accuracy and distance.
2. *Catching*.—Catching two types of punted balls according to the distance covered by the individual making the catch; catching forward passes.
3. *Kicking*.—Punt for distance; punt for accuracy; drop kick; place kick; kick-off.

4. *Running*.—The start; dodging; straight away.
5. *Pass Defense*.—Zone; man-to-man.

THE TESTS AND THE SUBJECTS

The tests were given to five classes in required physical education at Fresno State College. Though incomplete records were secured on a larger number of men, the total number of cases considered in the final study was eighty-seven.

Standardized directions were formulated for the eighteen tests under the five elements and were administered with the help of practice teachers and upper division major students.

Tennis shoes and gymnasium suits were required.

SUBJECTIVE AND OBJECTIVE SCORES

After an extensive study of the literature in the field, a check sheet for subjectively rating performance in each test was formulated. Fifteen instructors and upper division major students were then trained in the technique of judging ability by means of guides on the check sheet. The test group was judged in performance on each test, the scores of each element averaged and a final or composite subjective criterion score obtained. T-Scores were used to reduce raw scores to comparable units.

T-Scores were also set up for each objective test and the validity of the objective composite score as a measure of performance ability was established by means of its relationship to the subjective criterion score. The coefficient of correlation was fairly high ($r = .851$), indicating that the objective score was measuring to a reasonable degree the quality indicated by the judgment criterion.

SELECTION OF A SHORT BATTERY

In selecting a short battery of tests to measure criterion ability, a number of tests were eliminated because of low reliability and the necessity for administrative economy.

The battery of five tests which produced the highest correlation with the objective criterion ($r = .925$) includes:

1. Forward pass for distance.
2. Catching forward pass.
3. Punting for distance.
4. Running (50 yards carrying the ball).
5. Pass defense—zone.

A battery of three tests produced a correlation of $r = .880$ with the objective criterion. This battery may also be regarded as a fairly valid measure. It includes:

1. Forward pass for distance.
2. Punt for distance.
3. Running (50 yards carrying the ball).

ADMINISTRATION OF THE BATTERY

"The administration of the battery is simple, being economical of time, equipment, and field. The tests do not cause fatigue and scores are recorded on individual cards. Classes, as large as any one instructor should be called upon to teach, can be tested by means of the battery in one hour."¹

BATTERY UTILITY FOR TEACHING PURPOSES

"The battery can be used as a means of classifying students for purposes of instruction and competition, and will assist the instructor materially in giving the student his semester or course grade."²

TEST DESCRIPTIONS

Forward Pass for Distance.—Instructions concerning test. Read carefully.

The Field: Football field or playground. Lines marked every five yards, and with markers every ten yards, so that men throw from both ends of the field. One to six pairs of passers (depending on width of field) throwing together.

The Equipment: New regulation football as specified by the guide.

The Test: Men to throw in pairs, each man standing behind the end line when he throws. Each contestant is allowed three throws after one minute has been allowed for warming up. Best throw to count. Each throw must be preceded by the catch of a pass by center. Partners of men who have just thrown should spot the point where the ball hits at once without attempting to retrieve the ball until the distance has been estimated to the nearest yard. Do this by looking to the right (passer's right) at the five and ten yard lines. Record this distance on your partner's card to the nearest possible yard. Then retrieve the ball, go behind the end line, and take your throw. When three throws are finished, take your partner's card to the recorder (squad leader). Come in pairs and bring your ball with you.

The Score: As recorded on the card (raw score).

Catching Forward Pass.—Instructions concerning test. Read carefully.

The Field: Football field or playground marked as for "Forward Pass for Distance" and five-yard lines marked every five yards from sideline to sideline. Lanes to be marked as described under "The Test."

The Equipment: New regulation football as specified in the guide.

The Test: No warm-up permitted. Each contestant allowed three "fair trials" at catching a forward pass. A "fair trial" is one in which

¹ Stanley E. Borleske, "A Study of the Achievement of College Men in Touch Football," unpublished Master's thesis, University of California, 1936, p. 94.

² Stanley E. Borleske, *loc. cit.*

the contestant could touch the ball with his hands by means of a "reasonable" effort. Each contestant must take one trial at catching the pass while routing himself as follows:

No. 1 Route: Go down ten yards from center, turn right angle to right and run for sideline parallel to goal line.

No. 2 Route: Go down ten yards from center; turn left at a thirty-five degree angle and continue running in this direction.

No. 3 Route: Start down and out at a forty-five degree angle until yard line fifteen yards from center is reached; then cut back toward center fifteen yards down the field from center.

The Score: Each pass actually caught and possession retained by catcher counts ten points. Maximum score is thirty points.

Punt for Distance.—Instructions concerning test. Read carefully.

The Field: Football field or playground marked as for "Forward Pass for Distance."

The Equipment: New regulation football as specified by the guide.

The Test: One minute warm-up permitted. Kickers work in pairs, each man standing at least seven yards behind center when he kicks, as designated by a line. Each kick is to be preceded by a catch of a pass from center and the ball is to be kicked within two seconds after the snap. Each man is allowed three punts for distance, the best punt to be the man's score. Partner of the man who has just punted should spot the point where the ball hits the ground, look to the kicker's right (partner's left) and estimate the distance to the nearest yard. Record the distance on your partner's card. Retrieve the ball and then go behind your punting line and take your trial. When through with three trials, report back, coming in pairs, bringing the ball and cards.

The Score: Longest punt in yards is the raw score.

Running—Straight-Away, Speed, or Sprint.—Instructions concerning the test. Read carefully.

The Field: Football field or playground marked as for "Forward Pass for Distance."

The Equipment: New regulation football as specified in the guide.

The Test: One minute allowed for warm-up. Contestant starts on snap of ball by center from point five yards back of center and from a backfield stance, i.e., three-point stance, catches the ball and carries it a total distance of fifty yards, running as fast as possible. Any form of carrying the ball used in football is permissible.

The Score: Only one trial allowed and the time serves as raw score.

Pass Defense—Zone.—Instructions concerning test. Read carefully.

The Field: As per diagram on page 77. The ball is placed at the point of intersection of the middle vertical line and the lower horizontal line. The passer must be 10 yards back of the center. The pass receivers are stationed as indicated in Figure 3.

The Equipment: New regulation football as specified by the guide.

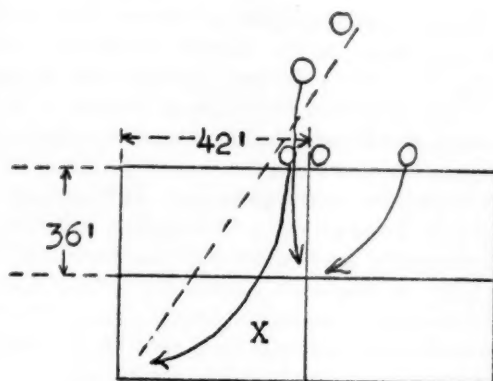


Figure 1--Situation No. 1

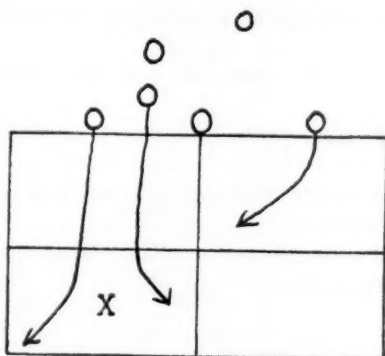


Figure 2--Situation No. 2

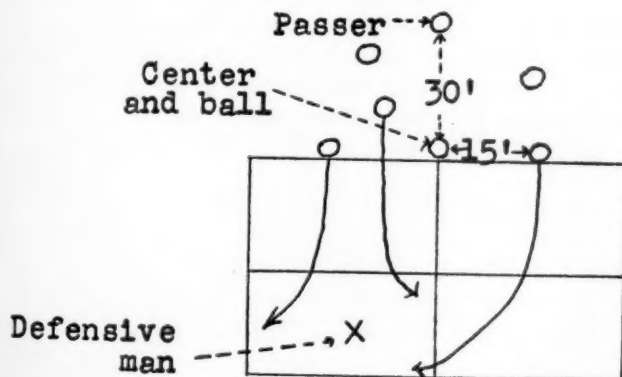


Figure 3--Situation No. 3

The Test: Three situations are presented to each defensive man in the deep zone shown on the diagram. Situation 1 calls for one receiver in the zone, Situation 2 for two receivers and Situation 3 for three receivers. These situations are shown in Figures 1, 2, and 3. The passer and receivers huddle and the situations are called without a particular arrangement. Receivers run down into the zones and passer throws to receivers attempting to complete pass. Defense man attempts to break up the pass by interception or by knocking ball down to the ground. If receiver completes pass under any condition according to regulation football rules, no points are allowed the defense man. Deduct one-third of earned points for each interference. Scorer checks receivers in the zone where ball is thrown and records the proper score. Receivers return ball to center. One trial for each situation.

The Score: If defense man knocks down ball with one receiver in his zone, he gets two points.

If defense man intercepts ball with one receiver in his zone, he gets four points.

If defense man knocks down ball with two receivers in his zone, he gets six points.

If defense man intercepts ball with two receivers in his zone, he gets eight points.

If defense man intercepts or knocks down ball with three men in his zone, he gets ten points.

Score minus one-third earned points for each interference. Maximum score is twenty-two points.

A Comparison of Nutritional Indices

By DELMAR ISAAC ALLMAN, DR. P.H.
Associate Professor of Physical Education
Michigan State Normal College, Ypsilanti

THIS study was conducted for the purpose of determining which of the three indices of nutrition—Baldwin-Wood Weight-Height-Age Tables, Pelidisi, or A-C-H—correlates most closely with an experienced doctor's estimate of nutritional status. The fact that there is so little agreement between the various indices of nutrition prompted the study. It consisted of the measurement of 1016 school children, eight to twelve years of age, in the schools of Ypsilanti, Michigan, and vicinity. There were 505 boys and 511 girls. Table I gives the age distribution of the children: the age was recorded as of the nearest birthday.

TABLE I

DISTRIBUTION OF AGE GROUPS OF 1016 SCHOOL CHILDREN USED IN THIS STUDY

Age	Boys	Girls	Total
8 years	80	86	166
9 years	95	102	197
10 years	103	124	227
11 years	114	100	214
12 years	113	99	212
Totals	505	511	1016

It is advisable to have in mind what we mean by the term "malnutrition" before proceeding with the problem. Manny explains the term very well when he says that it is not merely a matter of food, but that nutrition serves as an index of the results of the many strains and stresses that come from adenoids, enlarged and infected tonsils, defective eyesight, and other effects of native disability and unhygienic living.^{25 *}

Following is a description of the technique used in the four indices of nutrition:

1. The doctor's rating was recorded according to a modified Dunfermline scale, which consisted of four classifications, viz.:¹

a) Excellent—the nutrition of a healthy child of good social standing.

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Public Health, University of Michigan, 1936.

*Indices refer to Bibliography at the end of this article.

b) Good—a child whose nutrition falls just short of the above standard.

c) Fair—one whose nutrition is on the borderline of serious impairment and who should have some nutritional supervision.

d) Poor—one whose nutrition is seriously impaired, and who needs constant medical attention.

Those children classified in groups *c* and *d* were considered as malnourished.

The factors considered in making the ratings according to this scale were general appearance of the child, color of the skin and the mucous membranes, subcutaneous tissue, musculature, facial expression, lustre of eyes, posture, and any other symptoms of normal or abnormal nutritional status. The ratings were unbiased by any other nutritional scale, as the physician did not know the weight or the height of the children. The only way in which the factor of weight entered into the rating by this scale was by the general proportion of weight to height and age. Dr. Glenadine Snow of the Michigan State Normal College, Ypsilanti, made all the examinations and recorded them according to the above scale. Since she is doing this type of work regularly and has had several years' experience in this field, her judgment is considered as accurate as that of any doctor or pediatrician whose services might have been obtained.

2. According to the Baldwin-Wood Weight-Height-Age Tables, any child whose weight was ten per cent or more under the average for his or her height and age was considered and recorded as malnourished.²⁰ The authors claim for these tables that they can safely be used as good standards of growth, since the children from whom the tables were compiled were healthy, had physical training, medical inspection, and careful remedial treatment. For the rating according to this scale the weight was taken without shoes, and in ordinary clothing without sweaters, coats or jackets (all the children were weighed on the same scales—a new set of balance scales). The height was taken without shoes, being careful to have the subject's heels, hips, shoulders, and back of head touching the measuring standard.

3. The "Pelidisi" consists of the formula,⁷

$$\frac{\sqrt[3]{10 \times \text{body wgt. in grams}}}{\text{sitting height in centimeters}} = \text{Pelidisi}$$

with 95–100 being the ideal Pelidisi for a growing child who is well nourished. In this study a Pelidisi of 93 was considered as the minimum lower limit that a child could have and be considered as of having a satisfactory nutritional status; below this figure was recorded as malnourished. The apparatus which was used in obtaining the sitting height of the children consisted of a chair cut down so that the seat was just thirteen inches from the floor, and the front of the chair was twelve and

one-half inches from the back. To the back of the chair was fastened a meter stick. In taking the measurements for the sitting height care was taken to have the child sit erect, so that the sacrum was well against the back of the chair, and the shoulders and back of the head were against the measuring stick; a square was used against the measuring stick and the child's head to insure an accurate reading. Using a chair as low as this one prevented the muscles on the dorsum of the thighs touching the seat of the chair, so that the subject sat squarely on the tuberosities of the ischia. To follow out this technique uniformly it was necessary to place a block of wood under the feet of a few of the very smallest children. This method of measurement prevented variations of results as a result of the thigh muscles contracting. Undoubtedly the cause of the high percentage of malnutrition among children obtained by Baker and Blumenthal according to this method was due to the failure to take this precaution.¹ They had the subjects sit with the legs hanging over the edge of the chair so that the feet did not touch the floor. This would increase the sitting height which would result in a lower Pelidisi.

4. The A-C-H (Arms-Chest-Hips) index of nutritional status is fully explained in the pamphlet by Franzen and Palmer published by the American Child Health Association in 1934.²⁰ Briefly, it is as follows: all measurements were taken with sweaters and coats removed, upper arm laid bare, and the boys' pockets emptied. The instruments used in taking the measurements were a steel tape with a Gulick handle to insure uniform tension on all measurements, and large sliding wooden calipers, both graduated in tenths of centimeters. These instruments were purchased from the American Child Health Association, New York.

The measurements of the *arm* girth were taken with the steel tape. The child was instructed to "make a muscle" and the highest part of the biceps was marked with a crayon. Then the child was instructed to keep the arm in this position, but to relax the muscles and open the hand so that the finger tips loosely touched the shoulder: the measurement was then taken around the upper arm at the point marked by the crayon. Then another measurement was taken at the same place on the arm, but with the arm hanging loosely at the side. The sum of these two measurements was recorded on the score card.

The *chest* depth measurements were taken with the large sliding caliper according to the following procedure: the child stood naturally with his arms hanging at his side. The operator stood facing the child's left side and placed the caliper so that the base was at right angles to the lateral diameter of the chest, the movable branch of the caliper just beneath the inferior angle of the left scapula, and the fixed branch of the caliper just above the left nipple. Then as the child breathed naturally the readings were taken at both expiration and inspiration. The sum of these two readings was recorded and subtracted from the sum of the arm girth measurements: the difference was recorded on the score card.

The intertrochantric *hip* width was also taken with the sliding caliper: this measurement was taken facing the child who stood naturally with feet together and arms hanging at his sides. The measurement was recorded on the score card.

To determine the rating by this index of nutrition, the child is considered as malnourished if the difference between the sum of the chest measurements and the sum of the arm measurements is equal to or less than the minimum difference allowed for a child of this particular hip width, according to tables for boys and girls given in the pamphlet previously referred to.

This scale is intended for use on children from seven to twelve years of age, and the authors claim that it will select about ten per cent of a normal sampling of children.

The reason for using only those children from ages eight to twelve inclusive was that twelve years was the upper age limit for use of the A-C-H index, and it was found difficult to obtain authentic information from children younger than eight years of age. Table II gives a list of schools in which children were examined, the number of children examined (boys and girls), and the number and percentage malnourished according to the Dunfermline scale.

It will be noted that Prospect and Woodruff schools had the highest percentage of malnourished children—34.5 per cent and 28.8 per cent respectively. This was to be expected from the location of the schools and the social status of the majority of the families whose children attended these schools, the families being for the most part of the laboring class. Neither was it surprising to find the children from the Denton school having the lowest percentage of malnutrition—17.1 per cent, as this is a “rurban” community ideally located. In no case was the percentage of malnutrition as high among the girls as among the boys.

It will be noted in Chart I that in the case of the girls the lines representing the Dunfermline and the Baldwin-Wood scales run practically the same except for the eight-year age group, where the Baldwin-Wood tables select less than half as many as the physical examination (Dunfermline), as being malnourished.

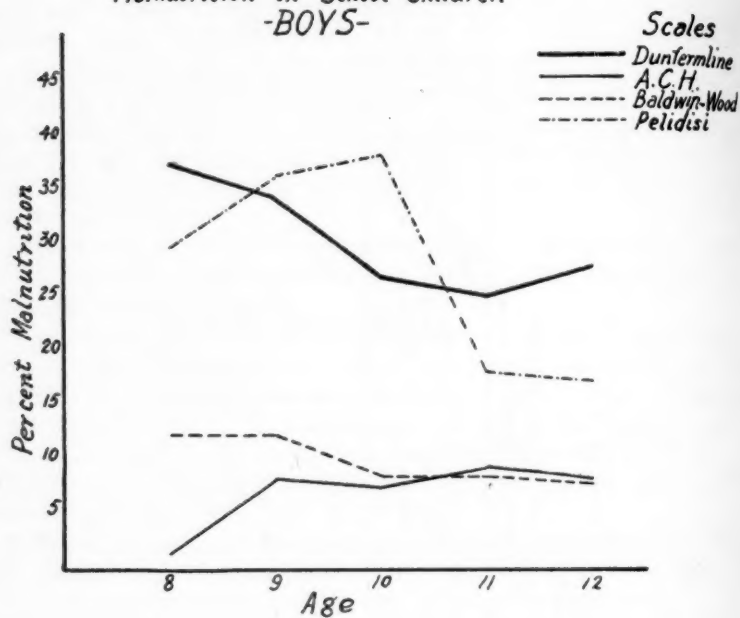
It also will be noted that the A-C-H index does not in this study select nearly as many cases of malnutrition as the authors claim for it—in this case selecting only 3.3 per cent. (See Table III.) In the case of the boys, the Pelidisi scale more nearly than the others approximates the percentages selected by the physical examination. According to the Dunfermline scale there seems to be less malnutrition in the eleven-year age group, for both boys and girls, than at any other period considered: this also is true of the Pelidisi except for age twelve in the case of boys, which is .7 per cent less than for age eleven.

Table III shows the percentage of malnutrition according to each of the four indices used—for boys and girls separately and for both sexes.

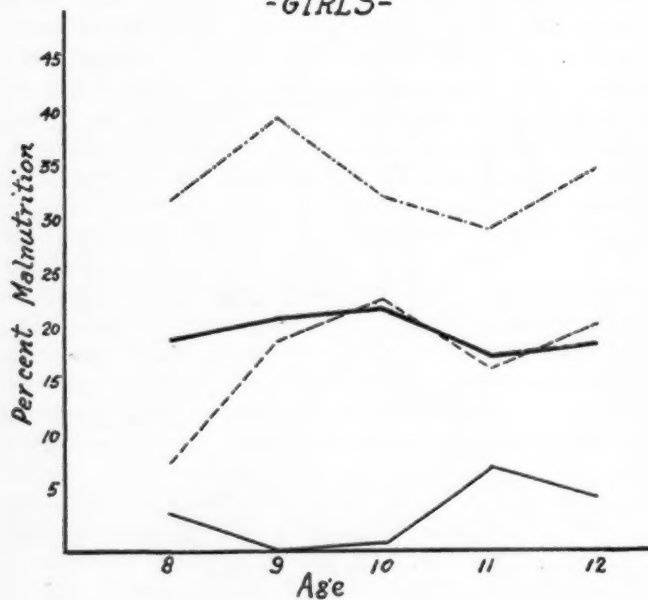
TABLE II
MALNUTRITION BY SCHOOLS AMONG 1016 SCHOOL CHILDREN
USED IN THIS STUDY. (DUNFERMLINE SCALE)

School	Total No. Examined	Boys		Girls		Boys and Girls	
		Number Malnour- ished	Per Cent Malnour- ished	Number Malnour- ished	Per Cent Malnour- ished	Number Malnour- ished	Total Per Cent Mal- nourished
Denton	41	6	21.4	1	7.7	7	17.1
Central	277	33	26.0	28	18.7	61	22.0
St. Johns	62	7	29.2	7	19.2	14	22.6
Roosevelt	144	19	28.4	14	18.2	33	22.9
Lincoln	209	33	29.5	20	20.6	53	25.4
Woodruff	170	31	36.0	18	21.4	49	28.8
Prospect	113	23	37.7	16	30.8	39	34.5
Totals	1016	152	30.1	104	20.4	256	25.2

CHART I
Malnutrition in School Children
-BOYS-



-GIRLS-



It will be noted in the table, as well as in Chart I, that on the average the Pelidisi more nearly than any other scale approximates the results of the physician's rating, and that the A-C-H index falls down dismally in the number of cases of malnutrition which it detects—in fact, it did not select a single case among the 102 girls in the nine-year age group, while the doctor selected twenty-two or 21.6 per cent of this group as showing clinical evidence of malnutrition. This is the age group in which the Pelidisi selected the highest percentage of malnourished cases—40.2 per cent.

TABLE III

PERCENTAGE MALNUTRITION AS DETERMINED BY THE EXAMINATION OF 1016 SCHOOL CHILDREN BY FOUR DIFFERENT METHODS

Sex	Dunfermline			Baldwin-Wood			Pelidisi			A-C-H		
	Total	No Maln.	Per Cent Maln.	Total	No Maln.	Per Cent Maln.	Total	No Maln.	Per Cent Maln.	Total	No Maln.	Per Cent Maln.
Boys	505	152	30.1	505	50	9.9	505	140	27.7	505	38	7.5
Girls	511	104	20.4	511	94	18.4	511	175	34.2	511	17	3.3
Both Sexes	1016	256	25.2	1016	144	14.2	1016	315	31.0	1016	55	5.4

Table IV shows statistically that the difference in percentages between the Dunfermline and the Pelidisi scales has no significance; i.e., that this difference could be due merely to chance and therefore that the Pelidisi could be used as a substitute index for a physician's rating of nutritional status. However, the differences in percentages between the Baldwin-Wood tables and the doctor's rating, and between the A-C-H and the doctor's rating are statistically significant and are too great to be due to chance: therefore, the Baldwin-Wood tables and the A-C-H index can not be recommended as satisfactory substitute indices for the doctor's rating of nutritional status.

Table V gives a comparison between the number of children selected by the physician (Dunfermline scale) as malnourished and the number selected by each of the other scales. It will be noted from this table that the Pelidisi selects more of the cases, selected by the physician as malnourished, than either of the other scales, although it selects many more than either of the other scales of those not selected by the physician's rating. It also will be noted that the A-C-H index selects only twenty-four of the 256 cases judged by the doctor as being malnourished.

It is interesting to note that even though the coefficient of correlation is higher, for the total of 1016 children, between the Dunfermline and the Weight-Height-Age scales than between the Dunfermline and

TABLE IV

STANDARD ERROR OF DIFFERENCE IN PERCENTAGES OF MALNUTRITION AS DETERMINED BY THE EXAMINATION OF 1016 SCHOOL CHILDREN BY FOUR DIFFERENT METHODS, USING THE DUNFERMLINE SCALE AS THE CRITERION

Dunfermline			Baldwin-Wood			Difference Per Cent	Standard Error of Difference
Total Number Children	Number Children Maln.	Per Cent Maln.	Total Number Children	Number Children Maln.	Per Cent Maln.		
1016	256	25.2	1016	144	14.2	11.0*	± 1.75
Dunfermline			Pelidisi				
1016	256	25.2	1016	315	31.0	5.8	± 1.99
Dunfermline			A C H				
1016	256	25.2	1016	55	5.4	19.8*	± 1.53

*The difference in these percentages is more than three times the standard error and is therefore statistically significant.

TABLE V

CORRELATION OF DIFFERENT SCALES WITH DOCTOR'S RATING AND PERCENTAGE AGREEMENT BETWEEN DIFFERENT SCALES AND DOCTOR'S RATING ON 1016 SCHOOL CHILDREN

Scales	Malnourished by One Scale Only	Malnourished by Both Scales	Malnourished by Neither Scale	Coefficient of Correlation	Probable Error	Per Cent Agreement in Malnourished Cases
Dunfermline - Weight-Height-Age	168 56	88	704	.534	.015	28.2 (88 ÷ 312)
Dunfermline - Pelidisi	114 173	142	587	.440	.017	33.1 (142 ÷ 429)
Dunfermline - A C H	232 31	24	729	.124	.021	8.4 (24 ÷ 287)

either of the other scales, the percentage agreement on the malnourished cases is higher between the Dunfermline and the Pelidisi than between the Dunfermline and either of the other scales. It can be seen from this table also that there is practically no correlation between the A-C-H and the Dunfermline scales, and that the percentage agreement on the malnourished cases is also very low. The computation of the coefficient of correlation depends not only upon the small group classed as malnourished, but also upon the much larger group not classed as malnourished. Since this latter group is much larger in the Dunfermline scale and the Baldwin-Wood tables comparison than in the comparison of the Dunfermline Scale with the Pelidisi, it is not surprising that the coefficient

of correlation is higher in the former case. It would be possible to have two indices of nutrition which did not pick a single case of malnutrition, yet there would be 100 per cent agreement between the two indices on the cases not malnourished, and possibly almost perfect correlation, but neither index would be of worth in evaluating the nutritional status of children. Therefore, it is not the coefficient of correlation by which we should be guided in selecting a nutritional index, but the agreement on those cases selected as malnourished.

To give a better idea of the pathetic lack of agreement between the various nutritional indices Table VI is presented. It is astonishing to note that although of the 1016 children 466 were rated as malnourished by one or more scales, only 7 of this number were rated as malnourished by all of the four scales. An analysis of Table VI will reveal that the A-C-H scale is in a large measure responsible for such a great disagreement between all scales, since the other three scales agree on 75 cases as being malnourished.

TABLE VI

TOTAL NUMBER OF CHILDREN RATED AS MALNOURISHED BY ONE OR MORE SCALES ON 1016 SCHOOL CHILDREN, AND PERCENTAGE AGREEMENT OF SCALES

Malnourished by All Scales	Malnourished by All Scales Except A-C-H	Malnourished by Some Scale, not by All Scales	Total Malnourished by Some or All Scales	Malnourished by No Scale	Percentage Agreement of Scales
7	68	459	466	550	1.5% (7÷466)

The question may arise as to how the doctor classified those children selected by the other scales as malnourished. The following figures will answer this question:

I. *Baldwin-Wood Tables*.—144 selected as malnourished:

Of these 28, or 19 per cent were rated by the doctor as poor,
61, or 43 per cent were rated by the doctor as fair,
52, or 36 per cent were rated by the doctor as good,
and 3, or 2 per cent were rated by the doctor as excellent.

II. *"Pelidisi"*.—315 selected as malnourished:

Of these 36, or 11.4 per cent were rated by the doctor as poor,
105, or 33.3 per cent were rated by the doctor as fair,
164, or 52.1 per cent were rated by the doctor as good,
and 10, or 3.2 per cent were rated by the doctor as excellent.

III. *A-C-H*.—55 selected as malnourished:

Of these 7, or 13 per cent were rated by the doctor as poor,
17, or 31 per cent were rated by the doctor as fair,
29, or 53 per cent were rated by the doctor as good,
and 2, or 3 per cent were rated by the doctor as excellent.

From these data it will be seen that from those cases selected as malnourished by each of the three indices, the percentage selected by the physician as malnourished is higher in the group selected by the Baldwin-Wood tables than in either the "Pelidisi" or the A-C-H.

As a result of the data collected in this study and the analysis thereof, the writer cannot agree with Franzen,^{18, 19, 20} Palmer, Mitchell, and coworkers that the new A-C-H index is a satisfactory index of nutritional status. This is apparent from the fact that this index selected only 24 of the 256 cases selected by an experienced pediatrician. There seems to be little choice between the "Pelidisi" and the Baldwin-Wood tables—the percentage agreement between the former and the physician's estimate of the malnourished cases being a little higher, while the coefficient of correlation between the latter and the doctor's estimate on the total number of cases (1016) is a little higher. (See Table V.) The doctor's rating was used as a criterion of the other nutritional indices, inasmuch as it is the consensus of opinion of nutritional workers that the experienced physician's estimate is the best-known method of determining the nutritional status of an individual.

This work may be criticized on the basis that the Dunfermline rating was made by the judgment of one physician only. It is the writer's opinion that the judgment of *one* physician, who has had a great amount of experience in judging the nutritional status of children, is to be preferred to the average judgment of several doctors, for the following reasons:

1. The judgment of *one* doctor is a rating which is very definite.
2. The judgments of several doctors introduce so many variables that it is difficult to come to a definite conclusion as to the nutritional status of an individual. A group of children examined by, let us say, five doctors, might be practically all classed as malnourished by some one of the five examiners. An interesting example of the wide discrepancies in judgment of examiners is given in the publication, "Physical Defects, the Pathway to Corrections,"²⁷ in reference to children recommended for tonsillectomy.

It will be interesting in connection with this work to consider briefly some of the factors which may influence the nutrition of children. Using the Dunfermline rating as the index of nutrition, the factors of race, occupation of father, number of children in the home, and the dwelling house congestion, will be considered to determine their influence, if any, on the nutritional status of the children.

In compiling Table VII for the race groupings and the malnutrition of children according to nationality, the nativity of the mother was used to insure uniform procedure. When the child did not know the principal European stock in the nationality of the parents, he was considered as American if his parents and grandparents were born in this country. Colored children are listed as a separate nationality. Eight nationalities

are listed, with the United States having almost half of the total number studied. To give an indication of the variety of nationalities under those not noted—there were fourteen additional nationalities included but the numbers in each were too small to consider separately. It will be noted that the highest incidence of malnutrition was among children of Irish stock, (31.1 per cent). Poland was lowest with only 10 per cent malnourished. The United States ranked in fifth position with 25.9 per cent malnourished. In this connection it is interesting to note that the average percentage of malnourished children of all nationalities was 25.2 per cent, or 256 children from the total of 1016 examined.

TABLE VII
MALNUTRITION BY RACE GROUPS AMONG 1016 SCHOOL CHILDREN
(DUNFERMLINE SCALE)

Nativity of Mother	Number Examined	Number Malnourished	Percentage Malnourished
Ireland	45	14	31.1
France	46	13	28.3
Colored	30	8	26.7
Germany	138	36	26.1
United States	474	123	25.9
England	166	39	23.5
Scotland	22	3	13.6
Poland	30	3	10.0
All Others (Combined)	65	17	26.2
Totals	1016	256	25.2

Malnutrition as determined by the occupation of the father is presented in Table VIII. In determining the classes, two classifications were used, viz., the non-laboring class consisting of professional and mercantile occupations, and the laboring class consisting of skilled and unskilled laborers. From this study it was determined that the percentage of malnourished children from the non-laboring homes was 20.7 per cent as

TABLE VIII
MALNUTRITION AMONG 1016 SCHOOL CHILDREN AS DETERMINED BY OCCUPATION OF FATHER (DUNFERMLINE SCALE)

Class	Total Number of Children	Number Malnourished	Per Cent Malnourished	Standard Difference	Error of Per Cent Difference
Non-Laboring (Professional and Mercantile)	213	44	20.7	5.7*	3.18
Laboring (Skilled and Unskilled)	803	212	26.4		
Totals	1016	256	25.2		

*The difference in these percentages is less than three times the standard error and is therefore statistically insignificant.

compared with 26.4 per cent from the laboring homes: although this seems to be a considerable difference in percentage, it is not statistically significant as evidenced by the standard error of difference.^{14, 84}

We often hear it said that a child coming from a home where there are no other children has a fair chance of being malnourished, even in the midst of plenty, as he is often pampered and spoiled so that he does not eat properly. In this connection it is interesting to note the information given in Table IX.

TABLE IX
MALNUTRITION AMONG 1016 SCHOOL CHILDREN ACCORDING TO NUMBER OF CHILDREN IN HOME (DUNFERMLINE SCALE)

Number of Children in Home	Total Number of Children	Number Malnourished	Percentage Malnourished	Difference Per Cent	Standard Error of Difference
One	105*	21	20.0	5.8†	4.16
More than one	911	235	25.8		
Totals	1016	256	25.2		

*Only five of these were in non-laboring class.

†The difference in these percentages is less than three times the standard error and is therefore statistically insignificant.

There were two classes of homes used for this study, viz., one of one child only in the home, and the other of homes having more than one child. The percentage of malnourished children in the former class was 20 per cent, while that for the latter class was 25.8 per cent. Although there is a difference of 5.8 per cent in favor of the homes having only one child, this difference is not statistically significant as evidenced by the standard error of difference.

Another factor which may influence the nutritional status of children is the dwelling house congestion, or the number of individuals per room of the home. To gain some information relative to this factor three classes were used in compiling Table X, representing different degrees of housing congestion:

- a) Children from homes having less than one person per room.
- b) Children from homes having one person per room.
- c) Children from homes having more than one person per room.

TABLE X
DWELLING HOUSE CONGESTION AS A FACTOR IN MALNUTRITION OF 1016 SCHOOL CHILDREN (DUNFERMLINE SCALE)

Degree of Housing Congestion	Number of Children	Number Malnourished	Percentage Malnourished
a) Less than one person per room	645	153	23.7
b) One person per room	133	36	27.1
c) More than one person per room	238	67	28.2
Totals	1016	256	25.2

From this study it was found that the percentage of malnourished children from class *a* was 23.7 per cent; from class *b* 27.1 per cent, and from class *c* 28.2 per cent. This would seem to indicate that nutrition is influenced by the degree of congestion in the dwelling, although these differences in percentages are not statistically significant.

CONCLUSION

This study seems to indicate the following:

1. There is little agreement between the various indices of nutrition used in this study.

2. Sex is a factor which has statistical significance as influencing nutrition, as evidenced by the doctor's rating of 20.4 per cent of the girls and 30.1 per cent of the boys as malnourished.

3. *a*) Considering both sexes as a group: neither the A-C-H index nor the Baldwin-Wood Weight-Height-Age Tables seems to select enough cases of malnutrition according to the doctor's rating. According to the percentage agreement with the doctor's rating of the cases of malnutrition, the choice of the scales should be—first, Pelidisi; second, Baldwin-Wood Tables, and third, the A-C-H index.

- b*) Considering the sexes separately: by referring to Chart I, it will be seen that in the case of the girls the Baldwin-Wood Table agrees very closely with the doctor's rating, while in the case of the boys the Pelidisi more nearly approximates the doctor's rating. The A-C-H has little agreement in either sex with the doctor's rating, but in the case of the boys it agrees quite closely with the Baldwin-Wood Table. The A-C-H seems better suited for use on boys than on girls.

Comments.—

1. Since there is very little difference between the Pelidisi and the Baldwin-Wood Tables in agreement with a physician's rating of the nutritional status of children, it may be advisable and more practical to use the Baldwin-Wood Tables on account of the complexity of the Pelidisi index.

2. Incidental to this study it was found that the factors of race, occupation of father, number of children in the family, and the degree of congestion in the dwelling, had no statistical significance as influencing the nutritional status of children. However, there seemed to be a tendency toward more malnutrition in the poorer homes, having several children in the family, and where the living quarters were congested.

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A Comparison of the Health and Physical Recreation Activities of High School Teachers and Coaches

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IN REGARD to the importance of safeguarding the teacher's health, the first author has had the following to say in another source: "No personnel problem is more vital than the health of the teacher, but the importance of the problem seems to have little relation to the efforts that are being exerted to safeguard the teacher's health. Medical inspection of pupils has been provided in the better schools. Physicians and school nurses have been employed; directors of physical education supervise health programs and introduce corrective exercises for the pupils. The hygienic condition of school plants has been improved. In the main, however, the objective has been the protection of the health of pupils. Perhaps the teacher has benefited in a circuitous and indirect manner. Despite the fact that the teacher's health should be as much a matter of public concern as the health of the pupils, the majority of teachers have not been concerned directly in the school's health program."¹ It was with this condition in mind that the present study was undertaken.

Unsatisfactory health and working conditions among teachers and coaches can be eliminated only when the nature of such conditions is known. It was with the idea of throwing some light on these conditions that this study was undertaken. Specifically the investigation attempted to do the following: (1) to determine the absolute and relative status of the health of high-school teachers and coaches in so far as certain criteria are concerned; (2) to show the relationship of time given to physical recreation, types of physical recreation activities engaged in, annual salaries, teaching loads, certain physical ailments, periodic physical examinations, and sick-leave provisions, taken separately, to the general status of health as determined in 1.

The authors found no significant studies relative to the status of

¹ Dennis H. Cooke, *Problems of the Teaching Personnel*, New York: Longmans, Green and Company, 1933), p. 354.

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health among high-school teachers and coaches. The only available method of gathering the desired information was by means of a comprehensive questionnaire which was sent, through the principals, to the teachers and coaches in all (200) of the rural and city high schools of Tennessee having 5 or more teachers. In these questionnaires which were returned by 668 teachers and 137 coaches, through the principals, from 92 of the high schools, information was given regarding the general status of their health and the physical recreation activities in which they engage. Another questionnaire was returned by the principals in 92 of the 200 schools in which data were given regarding absences of teachers and coaches due to illness, teaching loads of the two groups, and the administrative devices used to safeguard the teacher's health. In addition to supplying the information asked for in the questionnaire each teacher scored himself on a health score card which was prepared by the Committee on Health and Physical Education of the Massachusetts Teachers' Federation. The first part of the score card consists of 17 items on signs of health. The second part is made up of 24 items on health habits. A total of 1000 points is assigned to all these 41 items. As stated by the Committee, the purpose of the score card is as follows: "The score card was planned for the purpose of enabling teachers to score themselves regularly upon their health and upon those health practices which are necessary for enjoyment of life. Careful consideration has been given to the selection of the various items and to the relative value placed upon them. It is recognized, however, that even the most careful selection cannot represent a final authority. This piece of material is offered not as a substitute for careful medical diagnosis, but rather as a means of helpful stimulation."² The time covered by the study was the first six months of the school year 1935-36. The term "teacher" as used in the study means classroom teachers who do not coach any high school athletics or physical exercise activities. The term "coach" refers to directors or those in charge of any school athletics or physical exercise activities of the school, who, in addition, may teach part or most of the time.

ABSENCES FROM SCHOOL OF TEACHERS AND COACHES DUE TO ILLNESS

Although absence from school is probably not the most satisfactory criterion of teachers' and coaches' health, it constituted the best criterion available to the authors in this study. When it is recalled that the teachers and coaches under consideration reported to their principals that illness was the cause of the absences analyzed in this study, it might be concluded that there is some relationship between these absences due to illness and the general status of the teachers' and coaches' health.

² "Teacher's Own Health Card," *Journal of the National Education Association*, XVIII (April, 1929), p. 122.

From an analysis of Table I it appears that high school teachers are absent from school due to illness a larger number of days, on an average, than are high school coaches. The difference in the average number of such days absence apparently is statistically reliable when .83 is compared with .61. Due to the factors of natural selection on the part of coaches and the nature of their work it is to be expected that they will be absent a fewer number of days due to illness than will teachers. For the teacher to have a fewer number of absences would be contrary to all expectations. Although the difference between the two groups is large, an average absence of .79 days on the part of 805 teachers and coaches over a six-months period is not serious. This figure seems to

TABLE I
ABSENCES OF TEACHERS AND COACHES DUE TO ILLNESS

	Teachers				Coaches				Total Teachers and Coaches
	Men	Single Women	Married Women	Total	Men	Single Women	Married Women	Total	
Number Persons	249	338	81	668	117	16	4	137	805
Average Number Days Absent	.87	.82	.73	.83	.54	.44	3.33	.61	.79

indicate that, on the whole, teachers and coaches are a remarkably healthy group although coaches are more healthy than are teachers. Contrary to general expectations, the men teachers and coaches were absent a larger number of days, on an average, than women teachers and coaches, with the exception of married women coaches, of whom only four were considered. It is difficult to explain why single women teachers were absent an average of .09 days more than were married women teachers. The sixteen single women coaches considered in Table I were absent, on an average, decidedly less than were the four married women coaches.

HEALTH SCORES OF TEACHERS AND COACHES

As a further indication of the absolute and relative status of the health of high school teachers and coaches, 281 teachers and 60 coaches scored themselves on "The Teacher's Own Health Card," as explained in the first section of this report.

When the number of days of absence due to illness is used as the criterion of the status of health among the two groups, as given in Table I, the coaches appear to enjoy better health than do the teachers. But when the teachers and coaches score themselves on the health score card it is shown in Table II that there is relatively little difference in

the health of the two groups. The teachers and coaches each have a median score of 830, while the average score for the teachers is only 6 points larger than that for the coaches. Of the two measures, however, the one dealing with absences due to illness is more reliable. Again, both the women teachers and coaches have higher health scores than do the men teachers and coaches. In terms of the data in Tables I and II it appears safe to conclude at least tentatively, that the women teachers and coaches are healthier than the men teachers and coaches. It is shown further in Table II that men coaches have a higher health score than do men teachers, that single women teachers score higher than do single women coaches, and that the three married women coaches score considerably lower than do the 30 married women teachers.

TABLE II
HEALTH SCORES OF TEACHERS AND COACHES

	Teachers				Coaches			
	Men	Single Women	Married Women	Total	Men	Single Women	Married Women	Total
Number Persons	111	140	30	281	52	5	3	60
Average Score	806	827	834	823	820	840	730	817
Median Score	806	850	850	830	820	840	690	830

RELATION OF TIME SPENT IN PHYSICAL RECREATION ACTIVITIES TO ABSENCES DUE TO ILLNESS

In Table III is given the amount of time teachers and coaches spend in physical recreation activities per week. It will be observed that coaches spend an average of 1.7 hours per week more in physical recreation activities than do teachers. Since coaches are absent less frequently due to illness than are teachers, it can be reasoned that the amount of absence due to illness is in favor of the group which participates more

TABLE III
AMOUNT OF TIME TEACHERS AND COACHES SPEND IN
PHYSICAL RECREATION ACTIVITIES
PER WEEK

	Teachers			Coaches		
	Men	Women	Total	Men	Women	Total
Number Persons	86	110	196	50	3	53
Average Number Hours	10.7	9.0	9.7	11.2	14	11.4

in physical recreation activities. The differences are still in favor of the coaches when men coaches and teachers are compared and when women coaches and teachers are considered. In keeping with the conclusion above, the women coaches spend more time in such activities than do the men coaches, while the single women coaches have fewer absences due to illness than do the men coaches. An exception to these

generalizations is the fact that men teachers spend more time in physical recreation activities than do women teachers, while men teachers have a lower health score than women teachers in Table II.

RELATION OF PHYSICAL RECREATION ACTIVITIES TO ABSENCES DUE TO ILLNESS

From Table IV it will be observed that hiking, swimming, tennis, dancing, and hunting are participated in by the largest numbers of teachers, while tennis, hunting, hiking, swimming, and other types of athletics are engaged in most frequently by the coaches. Since coaches have a smaller average number of absences due to illness than do teach-

TABLE IV
NUMBER OF TEACHERS AND COACHES ENGAGING IN
CERTAIN PHYSICAL RECREATION ACTIVITIES

	Teachers			Coaches			Rank	
	Men	Women	Total	Men	Women	Total	Teachers	Coaches
Hiking	86	120	206	34	4	38	1	3.5
Swimming	48	81	129	31	7	38	2	3.5
Tennis	47	61	108	34	6	40	3	1
Dancing	16	52	68	13	4	17	4	6
Hunting	45	9	54	37	2	39	5	2
Work	21	8	29	6		6	6.5	9
Other Athletics	21	8	29	27	2	29	6.5	5
Golf	8	16	24	12	3	15	8	7
Horseback Riding	3	10	13				9.5	
Fishing	13		13	12		12	9.5	8
Skating	2	2	4	2	1	3	11	10
Rope Jumping		1	1				12	
Shooting				1		1		11

ers, it is possible that teachers should substitute some other type of athletics for dancing, since this is the only major difference in the activities frequently engaged in by the two groups. This recommendation is especially applicable to women teachers and coaches. It is obvious from the Rank column of Table IV that there is a relatively high correlation between the activities participated in by teachers and those engaged in by coaches.

RELATION OF ANNUAL SALARIES TO ABSENCES DUE TO ILLNESS

As is to be expected, it is shown in Table V that the annual average and median salaries of coaches are higher than those of teachers. In this connection it should be pointed out that the median salary is a more satisfactory measure than is the average salary, because the presence of a few high salaried men teachers and a few such men coaches has a tendency in Table V to increase the average salary disproportionately. A close analysis of Table V reveals some interesting comparisons. For example, the traditional difference between the salaries of men and

women teachers is in evidence. Men teachers receive more than women teachers, and men coaches receive more than women coaches, but the magnitude of the difference is less in the case of the coaches. There seems to be no logical explanation for the fact that men teachers receive more salary than do men coaches, while women coaches receive a larger average salary than do women teachers. Taking the entire group of teachers as a unit and the entire group of coaches as a unit, it is seen from Tables I and V that the coaches were absent less than the teachers due to illness and that they also received the larger salary. Although the men teachers and the men coaches were absent more due to illness than the women teachers and the women coaches, the former groups received larger salaries than did the latter ones.

TABLE V
ANNUAL SALARIES OF TEACHERS AND COACHES

	Men	Women	Total	Men	Women	Total
Number Persons	95	151	246	47	8	55
Average Salary	\$1299	\$857	\$1027	\$1145	\$896	\$1109
Median Salary	\$1200	\$865	\$ 900	\$1080	\$830	\$1084

RELATION OF TEACHING LOAD TO ABSENCES DUE TO ILLNESS

It will be noted in Table VI that, measured in terms of the number of pupil clock hours, the women teachers have heavier teaching loads than do the men teachers, while it was shown in Table V that they receive less salary than do the men teachers. On the other hand, the men coaches have slightly heavier teaching loads than do the women coaches. The men coaches also teach a larger number of pupil clock hours than do the men teachers. In addition to the teaching loads of the coaches indicated in Table VI they coach their athletic teams which makes their total load considerably heavier than that of the teachers.

TABLE VI
NUMBER OF PUPIL CLOCK HOURS TAUGHT BY TEACHERS
AND COACHES PER WEEK

	Coaches Teaching									
	Teachers		Less Than Half Time		Half Time		Over Half Time		Total	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Number Persons	122	353	2	2	1	1	72	81	75	84
Average Number Hours	545	578	125	125	475	475	620	608	596	595
Median Number Hours	575	593	125	125	475	475	630	580	618	570

Even so, the coaches are absent fewer days due to illness than are the teachers. It appears, therefore, that teaching load is not an important determiner of absences due to illness. Such conclusion has been reached in several previous studies dealing with factors affecting the health of teachers. Another implication from Table VI is that the administration of the school has not decreased the coaches' teaching loads beyond that of the teachers by virtue of the fact that the coaches have many duties in addition to their actual classroom teaching. It is obvious that the number of pupil clock hours will increase as the coach spends a larger percentage of his time in classroom teaching. This observation is brought out in Table VI.

RELATION OF CERTAIN PHYSICAL AILMENTS TO ABSENCE DUE TO ILLNESS

Since coaches are absent less than teachers due to illness, it might be expected that the number of different ailments of coaches would be less than the number for teachers, and so it is in Table VII. Whereas the absence of teachers are caused by ten different ailments, the absence of coaches are produced by only six ailments. Hemorrhoids was the only disease among coaches that did not occur among teachers. It should be noted that colds and influenza rank either first or second as causes of the

TABLE VII
NUMBER OF ABSENCES OF TEACHERS AND COACHES
DUE TO CERTAIN AILMENTS

Ailments	Teachers			Coaches			Rank	
	Men	Women	Total	Men	Women	Total	Teachers	Coaches
Colds	25	43	68	10	2	12	1	2
Influenza	38	18	56	12	10	22	2	1
Nervousness	25	16	41				3	
Appendicitis								
Operation	8	18	26				4	
Laryngitis	4	9	13	6		6	5	3
Tonsillitis	6	4	10	1		1	6	6
Intestinal								
Troubles		9	9				7	
Indigestion	5	1	6				8.5	
Bronchitis	3	3	6				8.5	
Sinus	2		2	4		4	10	4.5
Hemorrhoids ...				4		4		4.5

absence of both teachers and coaches. This is true among both men and women teachers and coaches. It is the opinion of some health authorities that laryngitis is a true occupational disease among teachers; but ranking only third and sixth among the coaches and teachers, respectively, in this study, it appears that this ailment possibly is not as common among coaches and teachers in Tennessee as in other sections of the

country. It is interesting to note that nervousness ranks higher as an ailment among men teachers than among women teachers, while it is not a factor in the absences of coaches. On the whole, there is very little difference in the frequency of occurrence of the respective ailments among men and women teachers and coaches.

RELATION OF PERIODICAL PHYSICAL EXAMINATIONS TO ABSENCES DUE TO ILLNESS

Meager though they are, the data in Table VIII seem to point to the conclusion that, taking the teachers and coaches as a single group, the number of absences due to illness varies in an inverse ratio with periodical physical examinations. In other words, it appears that those teachers and coaches who have periodical physical examinations are absent

TABLE VIII
ABSENCES OF TEACHERS AND COACHES AS RELATED TO
PERIODICAL PHYSICAL EXAMINATIONS

	Teachers			Coaches			Teachers and Coaches
	Men	Women	Total	Men	Women	Total	
Those Who Have Periodical Physical Examinations:							
Number Persons.....	12	23	35	9	2	11	46
Average Number Days Absent.....	1	1.32	1.31	.22		.18	1.04
Those Who Do Not Have Periodical Physical Examinations:							
Number Persons.....	237	396	633	108	18	126	759
Average Number Days Absent.....	.86	.65	.73	.571	1.11	.65	.72

more due to illness than are those teachers and coaches who do not have such examinations. The irony of this situation, of course, is the fact that those teachers and coaches who are frequently sick are those who have the periodical examinations. There is, however, one minor exception to the above generalization. The coaches who have periodical physical examinations are absent less frequently due to illness than are those coaches who do not have such examinations.

RELATION OF SICK LEAVE PROVISIONS TO ABSENCE DUE TO ILLNESS

From Table IX it will be observed that approximately one-third of the 242 teachers who are granted sick leave are granted such leave with full pay, a third are granted sick leave with part pay, and another third have sick leave with no pay. The corresponding percentages are approximately the same for the 48 coaches with the exception that a larger percentage of coaches than teachers are granted sick leave with no pay.

TABLE IX
NUMBER OF DAYS GRANTED TEACHERS AND COACHES PER YEAR
FOR SICK LEAVE

	Per Cent of Teachers			Per Cent of Coaches		
	Men	Women	Total	Men	Women	Total
Number Days with Full Pay:						
Ten or Less.....	10	3	13	10		10
More Than Ten.....	11	7	18	23	2	25
Total.....	21	10	31	33	2	35
Number Days with Part Pay:						
Ten or Less.....	1	2	3	2		2
More Than Ten.....	11	21	32	19	2	21
Total.....	12	23	35	21	2	23
Number Days with No Pay:						
Ten or Less.....						
More Than Ten.....	11	23	34	40	2	42
Total.....	11	23	34	40	2	42

TABLE X
ABSENCES OF TEACHERS AND COACHES AS RELATED TO
PROVISIONS FOR SICK LEAVE

	Teachers			Coaches		
	Men	Women	Total	Men	Women	Total
Those Who Have Sick Leave						
Number Persons.....	114	138	252	45	3	48
Average Number Days Absent	1.15	.86	.99	.93	1.67	.98
Those Without Sick Leave						
Number Persons.....	135	281	416	72	17	89
Average Number Days Absent	.63	.77	.72	.30	.88	.40

It is evident from Table X that both teachers and coaches take advantage of sick-leave provisions where such are available. It seems that where sick leave is granted in these schools it accomplishes its purpose since both teachers and coaches tend to be absent more frequently, due to illness, when such leave is granted than when it is not allowed. It is the type of practice, of course, that may be easily abused, but when surrounded with proper safeguards it can be administered very effectively.

As a final caution in interpreting the data reported in this study it should be pointed out that they are only applicable to Tennessee. It is believed, however, that they are typical of conditions in the southern states. There is need for similar studies in other states.

The Prediction of Total Potential Strength of Adult Males from Skeletal Build

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INTRODUCTION

THE purpose of this study is to predict total potential strength of adult males from skeletal build. "Total potential strength" is not interpreted as the "absolute total" strength that one is capable of developing, but rather the total strength that would be athletically useful to the individual. This problem might be stated: *The prediction of total potential athletically useful strength of adult males from skeletal build.*

METHOD OF PROCEDURE

An attempt was made to get subjects who were almost as strong as they were likely ever to become. Most of them were athletes competing in sports that would tend to develop strength to a high degree in all parts of the body. Sixty such males of college age were used as subjects in this study. Many of these athletes had won national championships in sports.

All of the measurements of strength and build were made by standard anthropometric methods. Corrections for fat were made by methods used in the Iowa Child Welfare Research Station. Each subject was measured by the entire battery of strength and build tests on one day, and this was repeated at a later date. The following measurements were used in computing the total strength: right grip, left grip, chest push, chest pull, thigh flexors, back lift, leg lift, chins, and dips. Chins and dips were converted into pounds by the McCloy method.¹

In testing each subject, the best marks made in each test item, at either testing period, were added and used as the total strength for that subject. The measurements used to determine skeletal build were: weight, sitting height, standing height, arm span, shoulder width, chest width, chest depth, hip width (bi-iliac), elbow width, knee width, and chest circumference. Fat measurements were taken to be used in correcting for fat, in the hip-width and chest-circumference measurements. The average of the two measurements of each build item was used as

¹C. H. McCloy, "A New Method of Scoring Chinning and Dipping," *RESEARCH QUARTERLY*, II: 4, (December, 1931).

the final measurement of that part when corrections for fat had been made. The weight of each individual was then predicted from the measurements of his standing height, chest circumference, hip width, knee width, and elbow width. This was done by a formula used in the Iowa Child Welfare Research Station.

STATISTICAL METHODS

Intercorrelations of the thirteen variables of strength and build were made. They were numbered as follows: 0, strength; 1, weight; 2, weight predicted; 3, sitting height; 4, standing height; 5, arm span; 6, shoulder width; 7, chest width; 8, chest depth; 9, hip width; 10, elbow width; 11, knee width; and 12, chest circumference. Partial correlations were then used to determine the relative strength predicting values of the variables. The results obtained were:

$$\begin{array}{ll} r_{01.2} = .0542 & r_{08.(12)} = .0863 \\ r_{03.11} = .0163 & r_{09.(11)} = .0912 \\ r_{04.11} = -.0290 & r_{09.2} = .0752 \\ r_{05.2} = .0699 & r_{0(11).2} = -.0605 \\ r_{06.2(12)} = .0721 & r_{02.(11)(12)} = .3827 \\ r_{06.2} = -.0979 & r_{0(12).2} = .1600 \\ r_{07.(12)} = .0027 & \end{array}$$

Multiple correlations were next tried giving the following results:

$$\begin{array}{l} RO.(12)(10)(11).2 = .6220 \\ RO.(12)(10)(11).94 = .6200 \\ RO.(12)(10)(11) = .6138 \end{array}$$

This showed that chest circumference, elbow width, and knee width gave almost the same correlation with strength as any combination of build in this group of variables.

The regression equation for this group was then computed by standard statistical methods and the strength was predicted for each of the sixty subjects by this formula (1)

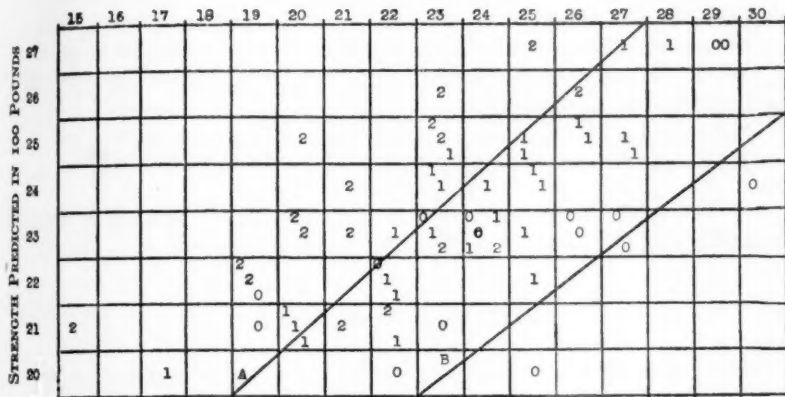
$$\text{Total strength} = 23.82 \text{ chest circumference} + 210.5 \text{ elbow width} + 102.24 \text{ knee width} - 2277$$

RAISING THE LINE OF REGRESSION

A judgment rating of each of the sixty subjects was made by the author, who had carefully studied each individual during the time the measurements were being taken. They were rated in three groups: 0 ratings were given those the author judged to be about as strong as they were likely to become. Those capable of bringing their total strength up by an appreciable amount were rated 1, and those capable of increasing their strength quite a bit more were rated 2.

A scattergram of the two variables—strength obtained by testing and strength predicted by formula (1)—was drawn, and the judgment ratings of the subjects were placed in the appropriate squares. The correlation between these two variables was .6370. The regression line "A" for predicting total strength from the regression values of these variables was then computed and drawn on the scattergram. This line represents the average strength for each "build category" for the sixty subjects.

STRENGTH OBTAINED IN 100 POUNDS



A is the line for predicting strength from formula I.

B is the line for predicting strength from formula II.

0, 1, and 2 represent the author's subjective rating of individuals explained on page 104.

A study of the scattergram shows that all but two of the subjects that had been rated 0 are above the mean line and all but two of the subjects rated 2 fell below the mean, while those rated 1 were about equally divided above and below.

According to the subjective judgment of the author, all but two of those who scored below the mean line were capable of such development as would bring their scores up to or above this line of regression. Since the purpose of this study was to predict total potential strength, it seemed desirable to raise the regression line to the place it would be if all of the subjects had been thoroughly developed when tested. It was, therefore, raised by approximately twice the standard error of estimate. This was done in spite of the fact that two of the subjects had actual strength that was slightly greater than that predicted for them, because the interpretation of the total potential strength is not the "absolute total", but rather the total amount which might be athletically useful to the individual.

The standard error of estimating strength by formula (1) is 229.66, and the mean score of strength predicted for the sixty subjects is 2,332 pounds. The mean score was divided by twice the standard error of estimate. This gave the per cent of the score at any given point along the scale that the new regression line was to be raised above the regression line used in formula (1). This resulted in raising the new regression line two standard errors of estimate for those whose predicted strength is 2,332 pounds, while it is raised proportionally more for those whose predicted strength is greater than the mean, and proportionally less for those whose predicted strength is less than the mean. A subject whose skeletal measurements are great would be expected to be able to increase his total strength more than one with measurements not so great.

When formula (1) was applied to this new regression line "B", it became formula (2), which is:

$$\text{Total potential strength} = 20.02 \text{ chest circumference} + 175.88 \text{ elbow width} + 85.91 \text{ knee width} - 1529.$$

Tables have been constructed to facilitate the calculation of total potential strength of adult males as predicted by formula (2).

METHOD OF USING TABLE I

To correct chest circumference for fat: Add the fat measured on the chest front and chest back, and subtract this sum algebraically from 35, which is the average sum of chest fat. Find this difference in the left hand column of the table and read its value directly opposite in the right hand column. This value is added or subtracted, according to its sign, from the actual chest girth.

Readings (= average) in millimeters.	Subtract (or add) in centimeters.	Readings (= average) in millimeters.	Subtract (or add) in centimeters.
1	.1	16	2.5
2	.3	17	2.7
3	.5	18	2.8
4	.6	19	3.0
5	.8	20	3.1
6	.9	21	3.3
7	1.1	22	3.5
8	1.3	23	3.6
9	1.4	24	3.8
10	1.6	25	3.9
11	1.7	26	4.1
12	1.9	27	4.2
13	2.0	28	4.4
14	2.2	29	4.6
15	2.4	30	4.7

METHOD OF USING TABLE II

Find the corrected chest measurement in the left hand column, and read its value directly across in the opposite column. The table values are given in centimeters; but their fractional values may be accounted for by adding two to the total score for each one tenth centimeter.

Find the elbow measurement in the column under *elbow* and read its value in the column immediately to the right. Knee values are found in the same way under the *knee* column. The sum of *chest*, *elbow*, and *knee* values is the predicted total potential strength of the individual, since the constant in the formula was deducted in the construction of the table.

TABLE II
THIS TABLE GIVES VALUES FOR FORMULA 2

Chest in cm.		Elbow in cm.		Knee in cm.	
80	602	6.0	532	8.7	747
81	622	6.1	550	8.8	756
82	642	6.2	568	8.9	765
83	662	6.3	585	9.0	773
84	682	6.4	603	9.1	782
85	702	6.5	621	9.2	790
86	722	6.6	638	9.3	799
87	742	6.7	656	9.4	808
88	762	6.8	674	9.5	816
89	782	6.9	691	9.6	825
90	802	7.0	709	9.7	833
91	822	7.1	727	9.8	842
92	842	7.2	745	9.9	851
93	862	7.3	762	10.0	859
94	882	7.4	780	10.1	868
95	902	7.5	798	10.2	876
96	922	7.6	815	10.3	885
97	942	7.7	833	10.4	893
98	962	7.8	851	10.5	902
99	982	7.9	868	10.6	911
100	1,002	8.0	886	10.7	919
				10.8	928
				10.9	936
				11.0	945

CONCLUSIONS AND RECOMMENDATIONS

1. Within limits, total possible strength of adult males can be predicted from skeletal build.

2. The results of this study are applicable only to those whose ages range from 18 to 50 years, which is the range of the ages of the subjects studied.

3. It is recommended that a similar study be made of boys of the junior high school and high school age range.

4. Information gained from this study should prove useful in the training of athletes for sports in which the strength element is important. By determining what strength an athlete has, and what he is capable of attaining, his training could be better directed.

5. This should serve as a guide for those who are interested in developing their strength to the maximum of their possibilities.

An Achievement Scale in Archery

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ACKNOWLEDGMENT

THE writer wishes to express her appreciation to those who have assisted in making this study possible. Special thanks are due to the members of the National Association of Directors of Physical Education for College Women, for their generous cooperation; and to Dr. Ruth Elliott, Wellesley College, and Miss Rosalind Cassidy, Mills College, for supporting the project during their respective administrations as President of the Directors' Association.

The writer is particularly grateful to Dr. J. Harold Williams, Professor of Education at the University of California at Los Angeles, for his generous and helpful guidance throughout the study, and to Dr. Frederick W. Cozens, Professor of Physical Education, for statistical assistance in preparing the achievement scale.

HISTORY OF THE PROJECT

The following report brings to a conclusion the National Research Study in Archery conducted by the National Association of the Directors of Physical Education for College Women. The study was begun in the spring of 1933 and was concluded at the end of the spring semester, 1936. Two previous reports, outlining the history, method of procedure, and partial results of the project, have already appeared in the *RESEARCH QUARTERLY*.¹ The reader is referred to these sources for a detailed account of the early stages of the experiment.

The purpose of this report is to supplement the preliminary findings, reported for 1935, with the data obtained during 1936. The achievement scale herein submitted represents the final results obtained from all data. A brief summary of the problem and method of procedure is given below.

THE PROBLEM AND METHOD OF PROCEDURE

The purpose of the study is to establish standards of achievement in archery for college women, based upon the performance of college students. Accuracy in shooting, as shown by the scores made at standard

¹ Edith I. Hyde, "Present Practices in the Teaching of Archery," *RESEARCH QUARTERLY*, VI; 4 (December, 1935), 104-116.

"National Research Study in Archery," *RESEARCH QUARTERLY*, VII: 4 (December, 1936), 64-73.

distances for women and girls, is taken as the criterion of achievement in archery.

The specific aim of the experiment is to provide an objective scale for evaluating archery scores for various distances, both during and at the end of certain periods of instruction and practice.

A survey of practices in teaching archery in 108 colleges revealed that the distances most commonly used in college archery classes were 30, 40, and 50 yards respectively. The Columbia Round, a standard archery event for women, includes all of these distances and in addition provides a total score for the entire event. For this reason, the Columbia Round was chosen as the unit for measuring achievement.

Standardized directions for using and scoring the event as a test were sent to all members of the Directors' Association participating in the project.

RESULTS OF THE TEST

During the period 1935-1936, records were obtained from twenty-seven different colleges in sixteen states.² Eighteen colleges reported scores during 1935, and fifteen colleges during 1936. Six colleges contributed scores for both years. The sectional divisions correspond to those established by the American Physical Education Association. The distribution of records from each section is given below.

Section	Number of scores	Number of colleges	Number of states
East	312	6	4
South	186	4	3
Mid-West and Central	314	6	5
North West	96	2	2
South West	654	9	2
Totals	1562	27	16

Since the records sent by some of the colleges were incomplete, the totals given in the following tables are slightly less than the total number of records received. The data were tabulated separately for 1935 and for 1936 so that differences might be observed. The results are shown in Table I.

² The following colleges contributed scores: College of the Pacific, Colorado State College, Fresno State College (California), Hood College, Iowa State College, Mills College, Mount Holyoke College, Northwestern University, Pomona College, Randolph-Macon College, Santa Barbara State College (California), Swarthmore College, Sweetbriar College, University of Arizona, University of California at Berkeley, University of California at Los Angeles, University of Georgia, University of Iowa, University of Montana, University of North Dakota, University of Southern California, University of Texas, University of Utah, University of Wichita, Vassar College, Wellesley College, and Wells College.

A comparison of the results obtained in 1935 with those for 1936 shows a slight superiority for the 1935 data. The difference in favor of the 1935 scores is apparent in both the first and the final Columbia Round, and is most marked between the final round scores for the two years. In neither case, however, is the difference between the data for the two years sufficiently great to be statistically significant.

The increase in scores between the first and final Columbia Rounds for both years is, however, statistically significant, and represents a true gain in achievement. This finding is to be expected since a considerable amount of practice had occurred, in most cases, between the first and final rounds.

Examination of the distributions in Table I, shows clearly the tendency toward skewness in the upper ranges of the archery data. This tendency is particularly marked in the scores made in the first round, and is less noticeable in the final round. The positive skewness in the distribution of archery scores may be the result of insufficient practice in shooting. The scores made in the first Columbia Round represent a minimum of practice at the distances included in the event, and no pre-

TABLE I
DISTRIBUTION OF SCORES FOR THE COLUMBIA ROUND
COMPARISON OF FIRST AND FINAL ROUNDS FOR 1935 AND 1936

Score	First Round			Final Round		
	1935	1936	Total 1935-1936	1935	1936	Total 1935-1936
425-449	1		1	4		4
400-424	1	1	2	4	1	5
375-399	3	0	3	7	4	11
350-374	2	5	7	13	5	18
325-349	5	5	10	16	12	28
300-324	5	7	12	30	18	48
275-299	15	16	31	38	26	64
250-274	35	22	57	54	32	86
225-249	38	24	62	61	50	111
200-224	59	36	95	72	75	147
175-199	62	46	108	95	90	185
150-174	75	61	136	87	104	191
125-149	94	82	176	94	101	195
100-124	113	114	227	90	73	163
75-99	108	137	245	56	52	108
50-74	89	75	164	34	23	57
25-49	66	40	106	12	12	24
0-24	14	10	24	4	3	7
N	785	681	1466	771	681	1452
Range	0-432	1-406	0-432	18-445	5-414	5-445
Mean	137.78	133.20	135.70	185.50	176.90	180.80
S. D.	74.20	71.70	72.70	79.62	70.72	76.70

vious practice in the round as a complete event in itself. Continued practice in shooting the round results in a more nearly normal distribution, but does not reduce the total range or variability of the scores.

The amount of practice between the first and final Columbia Round was not controlled or limited in any way. The results suggest a large amount of practice between the two rounds for some students, and little or no practice between rounds for others. This fact probably accounts for the extremely high and low scores made in the event. However, the continued tendency toward skewness suggests that many of the students had not practiced sufficiently to provide a reliable measure of their ability.

The achievement scale presented in this report is similar to the one submitted to the Directors' Association in April, 1936. The present scale, however, is based on nearly twice the number of cases used in constructing the preliminary scale. It is significant to observe that the addition of 681 scores to the preliminary data of approximately 780 scores does not influence the final score appreciably. With the addition of the 1936 data the target scores and corresponding scale values were slightly lowered in the final achievement scale.

The archery scale is sufficiently wide in range to provide a means of evaluating the success of both beginning and advanced archers. This is clearly evident by a comparison of the range of scores made in the National Women's Intercollegiate Archery Tournament for 1936, with the range of scores included in the archery scale. The scores made in the National Intercollegiate Archery Tournament represent the highest achievement reached by college women in the Columbia Round on official record. As such, these scores are highly selected in nature. The scores used in constructing the archery scale are representative of a much wider range of ability, as they include the scores of beginners who have never shot the Columbia Round before, as well as those who have had considerable practice in the event. In spite of the difference between the two groups, there are only two scores reported for the 1936 National Intercollegiate Tournament which fall outside of the upper limit of the archery achievement scale. The scale is, therefore, presented as a measuring instrument adapted to the evaluation of both beginning and advanced college women archers.

USE OF THE ARCHERY SCALE

The archery achievement scale consists of three parts. First, there is a scale for evaluating the achievement made as a whole in the first Columbia Round. This scale is for the total score made in the first round ever shot by a student.

Second, there is a scale for evaluating the total score made in the Columbia Round after an unlimited amount of practice in the event.

This scale would normally be used toward the end of the archery season to evaluate the highest or best score that the student has made during the semester.

The third part of the scale consists of three separate sections for evaluating the achievement made at *each* of the distances, 50, 40, and 30 yards, included in the round. This part of the scale may also be used to evaluate success in shooting during any practice period whenever 24 arrows constitute the practice unit. However, it must be remembered in this connection that this third part of the scale was constructed from the final or highest Columbia Round scores. Consequently, if used to measure the success of beginners as they practice at these distances, the achievement level should be expected to fall relatively low on the scale.

The scale has been made in such a way that a scale score of 50 represents the mean or average performance. A scale score of 100 is three standard deviations above the mean, and a scale score of 0 is three standard deviations below the mean. Each increase in the scale score column, therefore, represents an equal increment from the mean score. The archery scores, however, showed a tendency toward skewness in the upper ranges of the distribution. Consequently, while the increase in scale score from 0 to 50 on the archery scale represents an equal increment at all points, it is numerically smaller than the increments above the mean, or from 50 to 100 on the scale.

It was hoped that the addition of the 1936 data would eliminate the discrepancy in the size of the increments above and below the mean in the present scale. However, the tendency toward skewness remained the same in spite of a 90 per cent increase in the amount of data used in constructing the final scale. Because of the method used in scaling the archery scores, similar scale values are equivalent for all parts of the test. Thus, it is possible to add or average separate scale scores to obtain a total achievement score, if such is desired.

In conclusion, it is necessary to emphasize the fact that many uncontrollable factors operate to influence achievement in archery. These may be grouped under two headings, instructional and physical elements. Among instructional considerations are the following: amount of instruction, and practice in shooting, including length of the practice period and its frequency and regularity; the size of the instructional groups; previous experience; method or technique of shooting employed; and quality of instruction. Physical factors which affect success in archery include: the amount and quality of the equipment; geographical location with resultant climatic conditions; and whether or not there are indoor facilities for shooting during inclement weather. Since the scope of this investigation included various sections of the country, the effects of many of the above factors are probably greatly exaggerated. It is significant to note in this respect, that a recent survey among 100 leading archers in the United States and Canada gives the following

ACHIEVEMENT SCALES IN ARCHERY FOR COLLEGE WOMEN

EDITH I. HYDE

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Scales arranged by Dr. Frederick W. Cozens, University of California at Los Angeles

Scale Score	First Columbia	Final Columbia Round			
	Total Score	Total Score	50 Yards	40 Yards	30 Yards
			Target Score		
100	436	466	150	176	194
99	430	460	148	174	192
98	424	455	146	171	190
97	418	449	143	169	187
96	412	443	141	167	185
95	406	438	139	164	183
94	400	432	137	162	181
93	394	426	135	160	179
92	388	420	132	157	176
91	382	415	130	155	174
90	376	409	128	153	172
89	370	403	126	150	170
88	364	398	124	148	168
87	358	392	121	146	165
86	352	386	119	143	163
85	346	381	117	141	161
84	340	375	115	139	159
83	334	369	113	136	157
82	328	363	110	134	154
81	322	358	108	132	152
80	316	352	106	129	150
79	310	346	104	127	148
78	304	341	102	125	146
77	298	335	99	122	143
76	292	329	97	120	141
75	286	324	95	118	139
74	280	318	93	115	137
73	274	312	91	113	135
72	268	306	88	111	132
71	262	301	86	108	130
70	256	295	84	106	128
69	250	289	82	104	126
68	244	284	80	101	124
67	238	278	77	99	121
66	232	272	75	97	119
65	226	267	73	94	117
64	220	261	71	92	115
63	214	255	69	90	113
62	208	249	66	87	110
61	202	244	64	85	108
60	196	238	62	83	106
59	190	232	60	80	104
58	184	227	58	78	102
57	178	221	55	76	99
56	172	215	53	73	97
55	166	210	51	71	95
54	160	204	49	69	93
53	154	198	47	66	91
52	148	192	44	64	88
51	142	187	42	62	86

Score Scale	First Columbia		Final Columbia Round		
	Total Score	Total Score	50 Yards	40 Yards	30 Yards
Target Score					
50	136	181	40	59	84
49	133	178	39	58	82
48	131	174		57	80
47	128	171	38	56	79
46	125	167	37	55	77
45	122	164	36	53	75
44	120	160	35	52	74
43	117	157		51	72
42	114	153	34	50	70
41	111	150	33	49	69
40	109	146	32	47	67
39	106	143	31	46	65
38	103	139		45	64
37	100	136	30	44	62
36	98	132	29	43	60
35	95	129	28	42	59
34	92	125	27	40	57
33	89	122		39	55
32	87	118	26	38	54
31	84	115	25	37	52
30	81	111	24	36	50
29	78	108	23	34	49
28	76	104		33	47
27	73	101	22	32	45
26	70	97	21	31	44
25	67	94	20	30	42
24	65	90	19	28	40
23	62	87		27	39
22	59	83	18	26	37
21	56	80	17	25	35
20	54	76	16	24	34
19	51	73	15	23	32
18	48	69		21	30
17	45	66	14	20	29
16	43	62	13	19	27
15	40	59	12	18	25
14	37	55	11	17	24
13	34	52		15	22
12	32	48	10	14	20
11	29	45	9	13	19
10	26	41	8	12	17
9	23	38	7	11	15
8	21	34		9	14
7	18	31	6	8	12
6	15	27	5	7	10
5	12	24	4	6	9
4	10	20	3	5	7
3	7	17		4	5
2	4	13	2	2	4
1	1	10	1	1	2

three factors as of greatest importance in further increasing archery scores in general: improvement in technique of shooting, better instruction, and improvement in tackle.³

SUMMARY AND CONCLUSIONS

The following general statements may be made as a result of the measurement procedures used in this experiment:

1. It was possible to construct a scale for evaluating achievement in archery for college women in the Columbia Round, and for the component parts of this event.

2. The scale may be used to evaluate the first round score made by students after a minimum of practice, and the best round score made after an unlimited amount of practice.

3. It may also be used to evaluate achievement at 30, 40, and 50 yards at any time during the practice period whenever twenty-four arrows constitute the unit of practice.

4. The range of scores within the scale is sufficiently wide to permit evaluation of both beginning and advanced college women archers.

5. Increasing the amount of data used in constructing a preliminary scale by 90 per cent had no significant effect upon the final scale.

6. Many factors operate to influence achievement in archery. Further study of these factors in relation to success in shooting may result in both improved methods of instruction and higher levels of achievement.

³ Cia Craft, "Suggestions on Teaching Advanced Archery," *Journal of Health and Physical Education*, VII; 5 (May, 1936), pp. 322-323, 352-355.

An Analysis of the Activities of Physical Education Teachers in High Schools

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FOR some time the writer has been engaged in a rather comprehensive attempt at curriculum construction. The object of the undertaking has been to determine the content of the undergraduate training which, from the standpoint of The Ohio State University, would constitute the best preparation for teaching physical education in high schools.

The complete process of constructing the curriculum involves six steps: (1) selecting the positions for which the curriculum shall prepare; (2) determining the objectives of physical education as applied to the selected positions; (3) selecting the physical education activities which the graduates of the curriculum shall be prepared to teach; (4) determining the teacher activities which the graduates of the curriculum must be able to perform in their teaching; (5) assembling the methods, principles, and skills which one must learn in order to be able to perform the selected teacher activities in consonance with the objectives; (6) organizing into courses the raw materials thus assembled.

The present report is concerned only with the fourth of the steps mentioned above: it explains the process of analyzing the job of the physical education teacher into comparatively specific activities, and the further process of deciding which of these activities the teacher ought to be able to perform and for which, therefore, the curriculum must prepare its graduates.

In the interpretation of the report certain delimitations must be kept in mind. It has already been stated that the object of the undertaking was to design a curriculum for The Ohio State University. Second, the study is restricted to the training of men teachers. Third, it attempts to produce specifications for training in the teaching of physical education, but not health education. Finally, a point of view which has controlled the entire procedure must be kept constantly in mind. It is assumed that the general courses provided for all high school teachers alike will prepare physical education teachers to perform the activities of teachers in general, but not those which apply specifically to teachers of physical education. In accordance with this assumption, the only teachers' activities that will be recognized in this discussion are those which are unique

for teachers of physical education, or which are performed in a specialized way by such teachers.

The first step in deciding what activities of physical education should be accepted as objectives for the curriculum was to collect in as complete form as possible a list of the activities which such teachers actually perform, or which qualified persons believe that such teachers ought to perform. The making of this list involved two principal steps. First a preliminary list was made of the activities discovered through examination of a considerable body of professional literature. Second, this preliminary list was submitted to a number of teachers and students in the field with the request that they add to the list any items that may have been overlooked.

In the collection of teachers' activities from professional literature the first source examined was the check list of 1001 teachers' activities given in the *Commonwealth Teacher-Training Study*.¹

When all of the activities that seemed appropriate had been obtained from the Commonwealth list, attention was turned to the Bartlett and Boyd study of the Y.M.C.A. physical director.² Many of the activities mentioned in this study, although not so many as might be supposed, are also performed by high school physical education teachers. This list of activities was treated exactly as the Commonwealth list had been, and all activities that seemed to satisfy the criteria announced above were written down, one to a card, and added to those already collected.

Next were added the twenty-nine activities listed in Monroe's study of high school physical education teachers.³

At this point a bibliography of 8800 items was investigated. This bibliography had been prepared for other portions of the complete study. Each of the 8800 titles in the bibliography was examined and all appropriate teacher activities that were mentioned or suggested in the titles were recorded. The 5000 items of the McCurdy bibliography were given the same treatment.⁴

Finally, the texts of eighteen books on physical education, selected for their likelihood of suggesting activities, were either read or closely examined page by page for all mention of teachers' activities. No attempt was made to prevent duplication and all activities found were recorded.

From the search through these sources were collected nearly two thousand statements of activities performed by high school physical

¹ W. W. Charters, and Douglas Waples, *The Commonwealth Teacher Training Study*, (Chicago: The University of Chicago Press, 1929), pages 257-303.

² L. W. Bartlett, and A. W. Boyd, *The Y.M.C.A. Physical Director*, (Chicago: The University of Chicago Press, 1929).

³ Walter S. Monroe, *The Duties of Men Engaged as Physical Directors or Athletic Coaches in High Schools*, Bulletin No. 30, Bureau of Educational Research, University of Illinois, 1926.

⁴ J. H. McCurdy, *A Bibliography of Physical Training*, (Springfield, Mass.: Physical Directors' Society of the Young Men's Christian Association, 1905).

education teachers and believed to be specialized, at least in part, for teachers of this subject. The cards were then arranged alphabetically and duplicates eliminated. During this process other activities, to the number of about two hundred, were eliminated as not properly belonging to the list. The remaining statements still seemed to involve many distinctions so fine that it appeared the list would be more practical if a certain amount of telescoping were practiced. For instance, it seemed better to say "taking athletic teams on trips" than to say "taking basketball teams on trips," and "taking football teams on trips," and "taking track teams on trips." The guiding principle for the telescoping was one of usefulness for an actual curriculum. It seems that to say "adapting games to large numbers" means something that will actually function as part of the specifications for a curriculum, whereas to say "adapting volleyball to large numbers," "adapting soccer to large numbers," "adapting speedball to large numbers" and so on *ad infinitum* merely complicates the list and makes it confusing while adding nothing to its value in determining what shall be taught in the curriculum.

The 710 activities that remained after the elimination of duplicates and of superfluous items were thus telescoped until they were comprised in a new set of 330 activities. These 330 activities were then arranged for convenience into 35 groups with appropriately suggestive headings. Even though the preliminary list had been prepared after careful examination of a rather wide range of sources, it was not to be expected that it included all of the activities sought, and the next task to be undertaken was that of having the list checked for omissions. For this check, chief reliance was placed on the men actually on the job in Ohio high schools.

It was thought that the list should be checked by about fifty high school teachers. It was desired, however, to have the list checked only by men who would do so gladly and conscientiously, and so the list was not sent out originally with a request that it be checked, but rather a letter was sent to selected schools asking for men to volunteer their services, and the list was sent only to those who replied that they would be glad to help. The letters were sent to 226 schools, addressed to "The Director of Physical Education for Boys." Ninety men replied that they would be glad to help, but only the first 77 to reply were considered. The preliminary list, then, was sent to 77 men to be checked. Fifteen of the men went back on their promise, for only 62 lists were checked and returned. All of the 62 lists were complete and perfectly usable.

In addition to the 62 high school teachers, certain people at the University checked the list. These people included five men of the instructional staff in physical education,⁵ and also the secretary of the department and the athletic trainer; they also included five graduate

⁵ S. H. Cobb, H. G. Metcalf, B. F. Mooney, D. Oberteuffer, L. G. Staley.

students in physical education, among them two women.⁶ The staff members and students did not check the list for range of performance, but only for completeness.

Disregarding for the moment the check for range of performance, the result of the procedure just described was that 74 people each examined the list of activities, presumably with thoroughness, and added to it any missing activities which they had ever performed as teachers of physical education, or which they believed ought to be performed.

ACTIVITIES OF MEN PHYSICAL EDUCATION TEACHERS IN SECONDARY SCHOOLS—PRELIMINARY LIST

Directions for those checking the list for completeness.—

These pages contain a partial list of activities of men physical education teachers in junior or senior high schools. You are asked to examine the list carefully and to do two things:

1. Make a check mark at the left of each activity which you have ever performed as a physical education teacher or athletic coach.
2. Write down additional activities which you perform, or which other high school physical education teachers perform, or which you think ought to be performed.

The following directions and notes should be followed as guides:

a) We desire a complete list of the activities of teachers of physical education, including intramural and interscholastic athletics, but not including classroom health instruction or general health supervision.

b) Include all activities which are performed by a man because he is a physical education teacher or athletic coach, or which for such a teacher are different from the corresponding activities of other teachers, but do not include activities which have no specialized nature for a physical education teacher; e.g., "attending teachers' meetings" should *not* be included, because it is the same for all teachers; "taking attendance" *should* be included because, while it is common to all teachers, it is specialized for physical education.

c) Activities which you add to the list may be written anywhere on the margin or back of any sheet of the preliminary list, or on a blank sheet; you need make no attempt to classify them or to write them in the proper places.

d) In case of doubt, always add the activity.

e) The term "activity" is to be interpreted broadly so as to include not only overt physical activity but also such things as "deciding," "planning," "interpreting," etc.

f) Do not feel bound by the class headings of the preliminary list, but make a special effort to add new classes or to add activities which do not belong to any of the given classes.

g) Where you can, you should add more specific activities which are subdivisions of the activities of the preliminary list.

⁶ C. R. Crawford, J. C. Lawson, D. W. North, Elizabeth Smith, Mary Elizabeth Thompson.

The 74 people made 254 suggestions for additions to the list. Most of the suggested activities, however, proved on examination not to be new at all but to be already in the list. In certain cases activities were described by statements that seemed better than the original ones and the improved statements were substituted for the others. In other cases the new activities were telescoped with old ones and the new and old combined in a single statement. With all of the suggestions carefully examined and evaluated, a new list was made to include all additions; this new list is called the "Master List, Activities of Men Physical Education Teachers in Secondary Schools." It is given in full at the close of this report. The master list contains 341 activities, as compared with 330 in the Preliminary List. The master list, however, includes 59 items that are different from those of the preliminary list. Of the 59 items, 9 are not new at all but are merely old ones restated; 10 are the products of telescoping; 40 are actually new. The 10 telescoped activities are for the most part not new, but rather several old ones combined. In a few cases the telescoping covered a number of old activities; this fact explains the situation that the master list includes only 11 activities more than the preliminary list in spite of the fact that it includes 40 new items.

It has been explained that the 62 high school teachers who checked the preliminary list for completeness were all asked to indicate which of the activities they themselves actually performed on the job. The number of men performing any given activity is the "range of performance" for the activity. It is obvious, then, that the range of performance was known for most of the activities of the master list, but unknown for the 59 activities not in the preliminary list. In order that the range of performance for these activities might be ascertained, they were made into a mimeographed list known as the "Supplementary List" which was then mailed to the same 62 men who had checked the preliminary list. Their replies completed the determination of the range of performance of the 341 activities of the master list, this range being indicated for each activity by the number of men, from a total of 62, performing the activity. The figures for the range of performance are to be found on the copy of the master list.

At this point the teacher activities were ready to be evaluated with a view to deciding whether or not they should be included as specifications for the curriculum. This evaluation involved a preliminary rating by six members of the staff of the physical education department at the university,⁷ and a final selection by three of them. For each of the six men a copy of the master list was prepared, showing the range of per-

⁷ S. H. Cobb, D. A. Hindman, H. G. Metcalf, B. F. Mooney, D. Oberteuffer, L. G. Staley.

formance. Each man was asked to evaluate the activities one at a time, according to the following instructions:

Consider the first activity in the list and note its range of performance. Ask yourself this question—"In attempting to achieve the objectives agreed upon, how important is it that a good teacher of physical education in a high school of Ohio shall be able to perform this activity?" If you consider it to be of great importance, write the figure 3 in the column headed "Importance"; if you consider it to be of average importance, write the figure 2 in this column; if you consider it to be of slight but positive importance, write the figure 1 in the column; if you consider it to be of practically zero importance, or of negative importance, then write the figure 0. Now, still considering the first activity in the list, ask yourself this question: "In view of its range of performance, and in view of my opinion of its importance, how necessary is it that physical education teachers receive pre-service training in the performance of the activity, rather than depending on learning that activity on the job?" If you consider pre-service training to be of great necessity, write the figure 3 in the column headed Training. Likewise write a 2 to indicate average necessity, 1 to indicate slight necessity, and 0 to indicate zero necessity. After you have finished with activity number 1, repeat the same process for number 2 and then for all of the other activities in order.

The ratings thus made were added to give a total rating of each activity on each of the two factors, this rating having a maximum value of 18 and a minimum of 0. With these ratings as a guide, but with no obligation to follow them, the committee of three⁸ then met and decided, after considerable discussion, which teacher activities should be retained for the curriculum and which ones eliminated. The result was the elimination of 51 activities and the retention of 290. These 290 teacher activities thus became specifications for the teacher-training curriculum; the curriculum must be such as to result in the ability to perform the activities.

It might be objected that the selection of the activities should have been made by a larger and more diversified group of people, but this objection seems unsound and the procedure suggested by it was purposely avoided as being unwise. The three men whose opinions were final in the present case were the ones who happened to have most to do with the training of physical education teachers at the University, and they happened to have a common philosophy at least with respect to the essentials of physical education. Their selection of activities to be covered by the curriculum can thus be seen to represent one definite point of view and can properly be represented as a selection made specifically for The Ohio State University by the men who have the right to speak officially for the University. In brief, it is claimed that the opinions actually used are the most pertinent and most valid opinions that could be used. Of course, they are still opinions and not objective facts, and

⁸ H. G. Metcalf, D. Oberteuffer, D. A. Hindman.

the selections based on them have the limitations and defects inherent in opinions.

MASTER LIST OF ACTIVITIES OF MEN PHYSICAL EDUCATION TEACHERS IN SECONDARY SCHOOLS

Explanation.—Activities not to be included in the teacher-training curriculum have been placed in brackets.

The figures in the first column at the left indicate the range of performance, based on the reports of 62 men.

The figures in the second column constitute the evaluation for importance, the maximum being eighteen and the minimum zero.

The figures in the third column indicate the evaluation for necessity of pre-service training, the maximum being 18 and the minimum 0.

I. SETTING UP OBJECTIVES

R	I	T	
52	18	18	1. Setting up general objectives
44	18	18	2. Setting up specific objectives in harmony with general objectives

II. PLANNING FOR CLASS ACTIVITIES

59	18	16	3. Planning work
55	16	14	4. Determining pupils' interests
17	14	13	5. Making a survey of a community
38	14	16	6. Allowing pupils to elect physical education activities
47	18	18	7. Securing command of subject matter
47	16	15	8. Determining space needed for activities
41	16	10	9. Determining cost of activities
34	12	13	10. Deciding on size of classes
47	18	16	11. Planning schedules
48	17	11	12. Scheduling the use of facilities
[14	8	1	13. Arranging for pianist]

III. SELECTING AND ORGANIZING SUBJECT MATTER

37	18	18	14. Selecting materials for study
58	18	18	15. Selecting physical education activities
52	15	14	16. Modifying physical education activities
[46	11	5	17. Inventing new physical education activities]
29	15	14	18. Making a course of study
52	16	17	19. Correlating physical education with health education
45	13	12	20. Correlating physical education with other school subjects
45	16	15	21. Securing teaching material from professional literature
[22	11	7	22. Following a syllabus or handbook]
11	11	12	23. Selecting music for rhythmic activities

IV. DEVELOPING AND MAINTAINING INTEREST

57	17	17	24. Popularizing various games and activities
51	18	15	25. Developing and maintaining interest
45	16	14	26. Selecting incentives
48	14	14	27. Following up interests

V. INSTRUCTING

57	17	17	28. Presenting, explaining, and illustrating objectives to pupils
54	18	18	29. Adapting instruction to pupils' interests, abilities, and needs

R I T

54	17	16	30. Imparting to pupils a knowledge of their defects and needs
56	16	16	31. Indicating pupils' difficulties and errors
56	17	17	32. Suggesting methods of overcoming difficulties
56	16	14	33. Discussing problems with pupils
47	15	15	34. Selecting points for special emphasis
50	15	15	35. Demonstrating skills and learning procedures
59	18	18	36. Explaining games
[54	12	5	37. Participating in the play of pupils]
[55	9	11	38. Giving gymnastic commands]
61	14	14	39. Making class activities competitive in spirit
[21	11	11	40. Following a syllabus or handbook]
53	16	11	41. Economizing time
47	13	12	42. Avoiding unnecessary participation by teacher in class work
51	15	12	43. Distributing opportunities among pupils
57	16	13	44. Increasing pupil responsibility
44	15	15	45. Teaching methods of work
42	14	13	46. Making assignments

VI. EVALUATING PUPIL ACHIEVEMENTS, ABILITIES, AND NEEDS

39	13	16	47. Organizing a program of tests and measurements
28	7	13	48. Organizing all-year scoring systems
40	12	14	49. Recording results of tests
30	13	14	50. Constructing athletic scoring tables
39	13	17	51. Establishing standards for tests
32	9	9	52. Making general health examinations
34	18	18	53. Assisting in general health examinations
23	12	12	54. Making follow-up examinations
53	17	16	55. Detecting physical defects
39	11	14	56. Making health inspections
17	6	9	57. Examining the heart
[5	3	6	58. Measuring metabolism]
[4	7	8	59. Determining blood pressure]
[6	8	9	60. Making and scoring anthropometric measurements]
[44	9	9	61. Using height-weight charts]
[10	5	6	62. Determining vital capacity]
12	9	12	63. Measuring organic fitness
[10	7	8	64. Determining anatomical age]
13	10	10	65. Determining physiological age
17	12	12	66. Determining physical type
25	9	10	67. Rating posture
21	9	10	68. Recording posture
26	15	15	69. Giving various standardized tests
[13	8	10	70. Measuring muscular strength]
11	12	12	71. Measuring capacity to learn
26	15	15	72. Measuring achievement in individual activities
16	15	15	73. Measuring general motor achievement
[33	9	10	74. Measuring character]
[38	12	11	75. Measuring sportsmanship]
22	12	13	76. Testing information
30	13	13	77. Setting up standards of achievement
41	17	17	78. Diagnosing pupils' difficulties and needs
44	16	15	79. Determining aptitude for sports
34	15	14	80. Measuring progress

R I T

- 29 10 11 81. Using a point system as a basis for awards
 46 17 18 82. Grading pupils in physical education

VII. PLANNING, COMPILING, AND USING RECORDS AND REPORTS

- 40 16 16 83. Making reports on work
 36 15 15 84. Compiling data about work
 27 13 13 85. Designing blank forms
 35 16 14 86. Keeping and filing records
 25 11 10 87. Using charts, pin maps, and the like
 25 14 12 88. Sending reports to parents
 56 16 12 89. Taking attendance
 46 17 10 90. Making out and keeping records and reports of tardiness and absence
 24 13 13 91. Charting football games
 50 13 13 92. Charting basketball games
 41 15 12 93. Tabulating points made in contests
 51 14 13 94. Keeping complete records of athletic contests
 32 15 14 95. Making accident reports
 33 17 17 96. Recording findings of health examinations
 48 14 13 97. Tabulating records
 34 14 13 98. Reporting remediable defects to physician or dentist

VIII. INFLUENCING AND DIRECTING PERSONAL CONDUCT OF PUPILS IN RELATION TO OTHER PUPILS AND TEACHERS ON SCHOOL PREMISES

- [58 12 6 99. Settling grievances]
 [56 13 6 100. Smoothing relationships]
 [39 14 7 101. Breaking down reserve of participants]
 58 18 11 102. Securing student cooperation
 59 17 13 103. Maintaining morale
 61 18 16 104. Maintaining discipline
 59 18 13 105. Explaining and enforcing regulations
 54 15 14 106. Preventing thefts
 55 15 10 107. Controlling unwarranted use of privileges

IX. INFLUENCING AND DIRECTING PUPIL CONDUCT IN THE PERFORMANCE OF ROUTINE SCHOOL ACTIVITIES

- 49 15 12 108. Rewarding meritorious conduct
 55 14 12 109. Penalizing misdemeanors
 31 9 7 110. Giving prizes
 42 15 10 111. Giving special recognition for outstanding achievement
 47 16 10 112. Acquainting students with rules of procedure
 53 15 12 113. Supervising dressing and bathing
 58 16 12 114. Enforcing regulations

X. CLASSIFYING OR GROUPING PUPILS

- 33 18 18 115. Classifying pupils according to needs and abilities
 27 17 17 116. Determining basis for division of classes
 22 17 16 117. Giving examinations and tests to classify pupils
 36 14 15 118. Classifying by grade, age, height, and weight
 22 15 16 119. Determining handicaps for various sports

XI. ADAPTING SUBJECT MATTER OR TEACHING PROCEDURE TO PHYSICAL CONDITIONS OR SIZE OF CLASS

R I T

- | | | | |
|----|----|----|--|
| 52 | 17 | 16 | 120. Modifying games to meet special conditions |
| 56 | 17 | 16 | 121. Adapting games to large numbers |
| 54 | 17 | 16 | 122. Adapting teaching procedure to room and equipment |
| 57 | 16 | 10 | 123. Making ground rules |

XII. UTILIZING PUPIL ASSISTANTS

- | | | | |
|----|----|----|---|
| 53 | 18 | 11 | 124. Selecting pupil leaders |
| 51 | 18 | 13 | 125. Training pupil leaders |
| 20 | 14 | 13 | 126. Organizing and guiding a leaders' club |
| 34 | 16 | 13 | 127. Organizing and operating the squad and leader system |
| 57 | 16 | 12 | 128. Assigning duties and responsibilities |
| 42 | 15 | 10 | 129. Granting privileges and distinctions to leaders |

XIII. CONTROLLING TARDINESS AND ABSENCE

- | | | | |
|------|----|----|---|
| 49 | 15 | 11 | 130. Making regulations for tardiness and absence |
| 50 | 16 | 10 | 131. Making and keeping records of tardiness and absence. |
| [50] | 16 | 8 | 132. Reporting tardiness and absence] |

XIV. OFFERING GUIDANCE AND HELP TO PUPILS IN MATTERS NOT DIRECTLY RELATED TO SCHOOL ACTIVITIES

- | | | | |
|------|----|----|---|
| 45 | 14 | 13 | 133. Guiding students about professional training in physical education |
| 55 | 17 | 17 | 134. Counseling on sportsmanship |
| [54] | 15 | 10 | 135. Counseling on general conduct] |
| 54 | 17 | 18 | 136. Giving advice on health |

XV. MAKING ANNOUNCEMENTS

- | | | | |
|------|----|----|---|
| [52] | 11 | 10 | 137. Writing notices and signs] |
| 58 | 15 | 8 | 138. Providing and using a bulletin board |
| 20 | 9 | 5 | 139. Arranging a poster exhibit |
| 23 | 10 | 8 | 140. Issuing bulletins and publications |
| 53 | 14 | 7 | 141. Making announcements orally |

XVI. ORGANIZING AND CONDUCTING LEAGUES, SCHEDULES, AND TOURNAMENTS

- | | | | |
|----|----|----|---|
| 58 | 17 | 18 | 142. Making schedules for athletic teams |
| 51 | 16 | 15 | 143. Determining standings of teams |
| 29 | 14 | 11 | 144. Organizing and conducting public schools athletic leagues |
| 39 | 17 | 16 | 145. Organizing and conducting leagues for various sports |
| 51 | 17 | 16 | 146. Making league schedules |
| 49 | 17 | 15 | 147. Setting up league rules |
| 42 | 16 | 15 | 148. Scheduling and conducting round robin tournaments |
| 50 | 15 | 15 | 149. Scheduling and conducting elimination tournaments |
| 18 | 14 | 15 | 150. Scheduling and conducting perpetual tournaments |
| 51 | 14 | 13 | 151. Scheduling and conducting combination tournaments
(round-robin and elimination) |
| 31 | 14 | 14 | 152. Seeding players for tournaments |
| 31 | 15 | 15 | 153. Arranging heats or flights |

XVII. PREPARING FOR AND CONDUCTING GAMES, MEETS, FIELD DAYS, ETC.

- | | | | |
|----|----|----|---|
| 59 | 18 | 18 | 154. Preparing for and conducting athletic contests |
| 48 | 18 | 18 | 155. Preparing for and conducting track and field meets |
| 37 | 16 | 16 | 156. Preparing for and conducting field days |

R I T

- 30 13 13 157. Preparing for and conducting relay meets
 33 16 17 158. Preparing for and conducting mass track meets
 11 14 14 159. Preparing for and conducting swimming meets
 23 15 15 160. Preparing for and conducting playdays
 60 18 16 161. Getting facilities and equipment ready
 38 15 14 162. Preparing for and conducting demonstrations
 35 13 7 163. Having tickets printed
 37 14 11 164. Taking charge of ticket sales
 [35 12 6 165. Collecting gate receipts]
 36 12 8 166. Issuing passes and complimentary tickets
 34 11 8 167. Preparing printed programs
 48 16 14 168. Selecting and securing officials
 50 16 11 169. Considering the spectator
 46 14 10 170. Preparing or securing scoring sheets
 35 15 14 171. Preparing contracts for athletic contests
 29 15 10 172. Securing entries
 32 11 7 173. Operating score boards
 20 11 7 174. Controlling all selling at games and meets

XVIII. ACTING AS AN OFFICIAL

- 56 17 17 175. Acting as an official for various athletic or physical education activities

XIX. ACTIVITIES USUALLY APPLYING ONLY TO INTERSCHOOL ATHLETICS

- 47 18 18 176. Administering interschool athletics
 39 16 16 177. Establishing eligibility rules
 40 16 14 178. Interpreting and administering eligibility rules
 25 14 11 179. Establishing rules of amateurism
 32 15 14 180. Interpreting and administering rules of amateurism
 37 17 9 181. Keeping politics and jealousy out of athletics
 46 14 13 182. Supervising a team through a tournament
 51 17 13 183. Taking teams on trips
 39 9 8 184. Scouting
 57 18 8 185. Showing hospitality to visiting teams and coaches
 47 17 13 186. Operating a system of student managers
 [33 7 1 187. Operating a system of cheer leaders]
 [12 12 8 188. Holding officials' clinics]
 [34 10 4 189. Holding annual banquets for athletic teams]
 [40 5 1 190. Arranging for pep meetings]
 [20 3 3 191. Arranging for transportation of spectators]
 45 16 12 192. Educating spectators in sportsmanship
 14 13 6 193. Arranging for insurance for athletic injuries
 [36 8 2 194. Admitting visitors to practice sessions]
 [16 3 0 195. Issuing bulletins to squads during summer]

XX. ADMINISTERING INTRAMURAL ATHLETICS

- 43 18 18 196. Administering a program of intramural athletics

XXI. ACTIVITIES CONNECTED WITH PHYSICAL EDUCATION AND ATHLETICS FOR GIRLS AND WOMEN

- 16 10 13 197. Teaching classes of girls
 19 8 11 198. Coaching girls' teams
 14 12 14 199. Conducting intramural athletics for girls
 20 13 14 200. Conducting activities for boys and girls together

XXII. PREVENTING AND CARING FOR INJURIES

R I T

- 56 18 18 201. Preventing athletic injuries
 50 17 14 202. Inspecting equipment for safety
 57 17 17 203. Educating in accident prevention
 55 18 18 204. Debarring from athletics all those who are physically unfit
 40 17 17 205. Establishing safety regulations
 59 16 17 206. Treating athletic injuries
 59 17 18 207. Making provision for first aid
 59 18 18 208. Rendering first aid
 20 14 14 209. Teaching lifesaving
 40 14 15 210. Teaching first aid
 53 11 11 211. Massaging
 60 16 18 212. Bandaging and taping
 53 16 16 213. Establishing and enforcing training rules

XXIII. PREVENTING AND TREATING PHYSICAL DEFECTS

- 35 10 14 214. Correcting physical defects
 28 14 14 215. Preventing physical defects
 [10 4 6 216. Practicing physiotherapy]
 35 10 14 217. Administering corrective gymnastics
 48 13 15 218. Prescribing corrective exercises
 26 10 12 219. Controlling body weight

XXIV. SUPERVISING NON-ATHLETIC EXTRA-CURRICULAR ACTIVITIES

- 37 14 11 220. Assisting in the organization and conduct of clubs
 36 14 13 221. Assisting in the organization and conduct of an athletic association
 13 12 12 222. Producing amateur circuses
 5 10 11 223. Producing swimming pageants
 50 17 10 224. Assisting in the social activities of the school

XXV. MANAGING FINANCES

- 36 16 13 225. Providing for financial support of the department activities
 37 16 16 226. Administering athletic finances
 46 17 14 227. Planning expenditures of money
 32 12 11 228. Controlling fees

XXVI. PERFORMING ADMINISTRATIVE ACTIVITIES AND OFFICE DUTIES

- 23 13 12 229. Determining the name of the department
 35 17 10 230. Administering excuses from the requirement in physical education
 20 13 9 231. Keeping office hours for conferences
 42 13 9 232. Carrying on correspondence

XXVII. ACTIVITIES INVOLVING RELATIONSHIP WITH COLLEAGUES AND OFFICIALS

- 54 18 12 233. Maintaining cooperative relationship with school officials
 45 18 12 234. Maintaining cooperative relationship with supervisors
 43 18 12 235. Maintaining cooperative relationship with school nurse
 44 18 12 236. Maintaining cooperative relationship with school physician
 39 11 7 237. Maintaining cooperative relationship with school librarian
 47 18 12 238. Maintaining cooperative relationship with girls' physical education department
 42 17 10 239. Maintaining cooperative relationship with other departments

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- 47 18 10 240. Maintaining cooperative relationship with state high school athletic commissioner
- [52 18 7 241. Following directions of superior officers]
- 48 14 8 242. Getting faculty members to take responsibilities in connection with athletics
- 56 18 13 243. Complying with local and state laws
- 20 16 7 244. Securing appropriations
- 42 17 10 245. Making reports
- 44 17 10 246. Arousing interest of other teachers
- 26 14 12 247. Conducting recreation for teachers
- [17 12 11 248. Training teachers to lead physical education activities]
- 15 9 9 249. Training teachers in first aid
- [51 16 6 250. Discussing plans with school officials]
- 14 9 251. Supervising janitor service in locker rooms, etc.

XXVIII. ACTIVITIES INVOLVING RELATIONS WITH MEMBERS OF THE COMMUNITY

- 44 17 14 252. Arousing interest of the public
- 34 16 14 253. Educating the public
- 29 14 12 254. Carrying out a publicity program
- 30 16 16 255. Making public addresses
- [2 8 9 256. Broadcasting health talks and exercises]
- [4 6 7 257. Broadcasting games]
- 28 11 8 258. Advertising
- [25 12 5 259. Bringing in outside lecturers]
- 43 18 14 260. Maintaining cooperative relationship with parents
- 26 14 11 261. Organizing teams and leagues in the community
- 20 13 12 262. Providing physical education for members of the community
- 10 12 12 263. Helping to plan new churches and other buildings so as to provide proper play space
- 23 16 13 264. Helping local groups to plan and conduct recreation and physical education
- 27 14 10 265. Cooperating in establishment and conduct of Boy Scouts, etc.
- 29 15 14 266. Co-ordinating work of school and playgrounds
- [10 11 8 267. Supervising practice teachers]
- 33 16 13 268. Maintaining cooperative relationships with occupational groups, social organizations, and members of the community at large

XXIX. MAKING PROFESSIONAL AND SOCIAL CONTACTS

- [48 17 5 269. Joining and being active in professional, social, and recreational organizations]
- [52 18 5 270. Attending meetings, conventions, and conferences]
- [30 13 6 271. Serving in official capacity]
- 31 14 8 272. Contributing to programs
- 20 14 10 273. Giving talks and demonstrations to teachers' groups
- 38 14 15 274. Helping to secure the spread and improvement of physical education
- 43 18 13 275. Exhibiting professional spirit

XXX. IMPROVING SKILL IN TEACHING

- 57 17 14 276. Reading technical literature
- 45 17 13 277. Referring to persons and organizations for information
- 22 17 14 278. Referring to printed sources for information

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- 25 16 11 279. Organizing a professional library
 33 16 15 280. Studying and investigating professional problems
 [35 16 9 281. Taking courses in professional subjects]
 48 15 12 282. Practicing
 54 17 8 283. Learning by observing others

XXXI. IMPROVING PROFESSIONAL STATUS

- 26 11 12 284. Engaging in research
 [12 12 11 285. Writing for publication]
 33 17 14 286. Securing certification
 34 16 15 287. Meeting higher official standards
 [34 12 10 288. Developing a specialty]
 [25 14 11 289. Securing advanced degrees]

XXXII. PROVIDING FOR PERSONAL WELFARE

- [25 10 3 290. Supplementing salary from outside sources]
 [36 16 8 291. Taking physical examinations periodically]
 59 18 16 292. Maintaining good health
 59 17 11 293. Keeping in condition
 56 17 11 294. Maintaining good posture
 56 16 10 295. Participating in physical education activities
 58 17 12 296. Practicing what one preaches

XXXIII. ACTIVITIES IN CONNECTION WITH THE SCHOOL PLANT

- 37 18 11 297. Securing necessary space for activities
 24 14 15 298. Advising on construction of plant and equipment
 41 15 15 299. Laying out and constructing grounds and fields
 [2 5 7 300. Laying out and constructing a golf course]
 [1 6 7 301. Constructing an ice skating rink]
 39 16 14 302. Laying out and constructing indoor courts of various kinds
 35 17 14 303. Maintaining and improving plant and equipment
 40 17 15 304. Securing and maintaining proper lighting, temperature, and ventilation
 32 17 15 305. Supervising sanitation of plant
 6 11 13 306. Operating and maintaining swimming pools
 5 12 11 307. Treating pool water
 16 14 10 308. Issuing permits for use of plant
 23 14 11 309. Maintaining attractiveness of plant
 [11 7 5 310. Hiring and supervising laborers]
 25 16 9 311. Protecting grounds and fields
 31 16 15 312. Arranging a field for meets, field days, etc.
 [3 5 7 313. Operating a golf course]
 [3 6 8 314. Establishing par for a golf course]

XXXIV. ACTIVITIES IN CONNECTION WITH SUPPLIES AND EQUIPMENT

- 30 16 16 315. Equipping a gymnasium
 30 16 16 316. Equipping a play space
 46 16 16 317. Providing supplies and equipment for needs of pupils
 49 16 16 318. Providing supplies and equipment for games, meets, field days, etc.
 40 14 12 319. Making records and reports about supplies and equipment
 31 14 10 320. Issuing permits for the use of supplies and equipment
 41 13 13 321. Arranging supplies and equipment for use

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50	12	10	322. Making an inventory of supplies and equipment
29	13	12	323. Managing funds in connection with supplies and equipment
52	16	15	324. Selecting supplies and equipment
45	13	13	325. Selecting awards and trophies
49	12	13	326. Selecting clothing to be worn by pupils
56	16	14	327. Dressing properly for work
46	17	13	328. Securing supplies and equipment
56	15	10	329. "Checking out" supplies and equipment
30	10	9	330. Making supplies and equipment
55	15	15	331. Caring for supplies and equipment
59	15	12	332. Preventing loss of supplies and equipment
57	14	11	333. Inspecting supplies and equipment
51	14	9	334. Repairing supplies and equipment
47	14	14	335. Providing uniforms for varsity athletic teams
37	10	14	336. Providing uniforms for classes
51	15	14	337. Assigning or distributing supplies and equipment to pupils
45	15	15	338. Administering lockers
39	15	14	339. Administering locks for lockers
46	15	13	340. Administering showers
30	15	13	341. Administering soap and towels

Dynamic Aspects of Foot Postures During Walking

A comparison of the body mechanics of the lower extremity
for the normal strong foot and that of the flat pronated foot.

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INTRODUCTION

THE most effective program for the prevention of foot ills, or in the last resort for their cure, depends upon an appreciation of the feet as the foundation of the erect carriage and as the keynote to locomotion, and upon a clear understanding not only of the structure, but, more important, of the advantages and limitations of their mechanics.

The structure of the body is such that the weight of the head and trunk must be maintained on two supports of a highly unstable nature and with a relatively small base.

Walking is a succession of losing and regaining balance on these unstable pillars. The entire body enters into the activity, the movements of the upper body and extremities being secondary to the main action of the legs and for the purpose of maintaining balance with a minimum of tension.

Participation in those activities which we have appropriated into the physical education field, with the possible exception of swimming, is superposed upon the joints and muscles of the foot. This fact may seem too obvious to require statement. However, in the administration of the school athletic program it sometimes seems to be overlooked. Serious organic defects detected in the physical examination at once eliminate a student from activity which might produce further strain of the damaged tissue. Poor posture relegates a student to a corrective class. But it is seldom that the item of weak feet alone is taken as a contra-indication for the vigorous sports of the physical education program. We have heard much of the high percentage of rejections from the army of those applicants who had flat feet. Yet too often pupils with the same condition are overlooked by those examiners who sponsor a program of running and jumping, a program resulting in systematic strain of already weakened structures. It is not intended to deny or to minimize the importance of vigorous activity in the development and maintenance of good muscle tone, in the legs and feet as well as through-

out the body. The point here to be emphasized is that such activity in the natural sports program tends to increase the lack of balance between the antagonistic muscle groups of weak and pronated feet, thus increasing the defect.

The following analysis was made for the purpose of emphasizing these facts:

1. The importance of the body mechanics of the feet in relation to that of the knee and hip as
 - a) a problem of statics
 - b) the foundation of locomotion
2. The value of the correct use of the feet in locomotion (walking) in order to
 - a) maintain a strong posture of the feet
 - b) correct foot defects
 - c) safeguard against acute injuries of the foot, knee, and hip, which may be the result of the various forms of vigorous activities of the physical education program.



FIG. 1a. STRONG POSITION. Backward projection of big toe passes through the os calcis. (Meyer's Line.)



FIG. 1b. WEAK POSITION. Backward projection of big toe falls medialward of heel.

STATICS OF LOWER LEG

STRONG NORMAL POSITION

WEAK PRONATED POSITION

The Feet

The feet are placed parallel with each other and with the line of forward movement. The prints of the two feet are on two different lines a few inches apart. The alignment of the bones of the feet is such that a line drawn through the middle of the big toe and projected backward would pass through the center of the os calcis (Meyer's Line). Fig. 1a

The longitudinal arch extends from the distal ends of the metatarsals to the tuberosity of the os calcis, is present throughout the entire plantar surface as well as on the medial aspect, and is composed of the os calcis, talus, navicular, cuneiforms, and metatarsals.

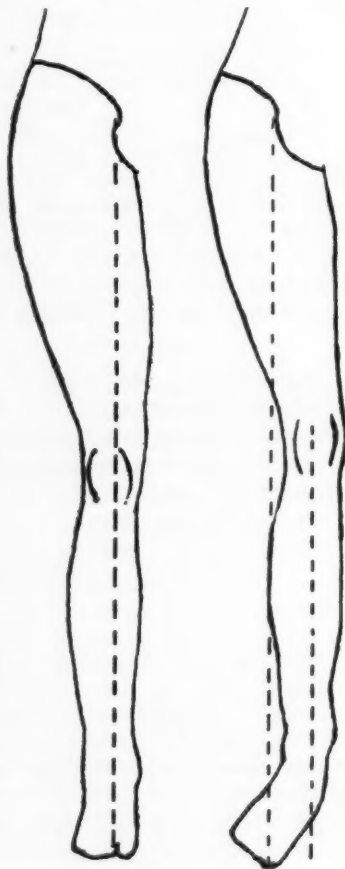
The feet are usually used in a toeing-out position (both abducted and everted.) The backward projection of Meyer's Line falls medialward of the heel. Fig. 1b

The long arch is depressed, the proximal ends of the metatarsals frequently becoming its anterior support. The navicular and first and second cuneiforms are also depressed.

STRONG NORMAL POSITION

The plantar calcaneo-navicular (spring) ligament, blending with the deltoid and the posterior tibial tendons, and the plantar aponeurosis are its chief support.

The transverse arch extends from the distal end of the first metatarsal (and its sesamoid bone) to the distal end of the fifth metatarsal. The highest point is under the second metatarsal and its projection backward to a point under the navicular. It is maintained by the dorsal and plantar interosseous ligaments.



WEAK PRONATED POSITION

The spring ligament is stretched, allowing the head of the talus to be depressed and displaced forward and medialward. Other tarsal ligaments are also stretched.

The heads of all or any one of the metatarsals become depressed due to strain on and elongation of the maintaining ligaments. The sesamoids, when present, are frequently displaced laterally and upward between the metatarsals.

FIG. 2a. (left) STRONG POSITION. Correct alignment of knees and hips.

FIG. 2b. (right) WEAK POSITION. Faulty alignment with strain on knees and foot.

STRONG NORMAL POSITION

WEAK PRONATED POSITION

Rotation inward of the os calcis, and slight changes in position of all tarsals result from the stretched ligaments.

Hallux valgus usually accompanies as the result of narrow pointed shoes and the pressure on the medial side of the big toe when pushing off from the toeing-out position.

The Knees

A plumb line dropped from the anterior superior spine of the pelvis should pass through the center of the patella and between the first and second metatarsals. Fig. 2a

The femur rests with equal pressure on the internal and external condyles of the tibia.

Plumb line falls lateral to the patella. Fig. 2b

Greater pressure on external condyle of tibia, with lateral semilunar cartilage pinched. Internal condyles of femur and tibia are separated and internal tibial collateral ligaments strained. External tibial collateral ligaments slightly shortened.

Knee joint is in easy extension, but not hyperextended.

The Hips

The hip joint is extended, not quite to its full limit. Iliofemoral ligament is not stretched.

There is no rotation either inward or outward.

Hip joint is held stable by tonic contraction of all hip muscles, the flexors and extensors maintaining antero-posterior balance with the abductors and adductors active though less prominent in the prevention of lateral swaying.

Hip joint rotated slightly inward, placing somewhat of a stretch on spiral fibers of ischiocapsular ligament and external rotators.

WALKING

Phase I.—Weight on the right foot. From a position where the left leg hangs practically vertically in line with the right leg until the moment when the left heel makes its first contact with the ground. Diagram 3.

STRONG NORMAL FEET

WEAK PRONATED FEET

Right Leg

(a) The *femur* goes from a position of slight adduction, due to sagging of the left side of the pelvis, (b) no rotation, (c) almost full extension into a position of (a) maintained slight adduction, (b) internal rotation, (c) increased extension due to the following muscular action:

Balance maintained by tonic contraction of tensor fasciae latae, gluteus medius and minimus.

Inward rotation is passive due to forward movement of left side of pelvis, which accompanies the action of the left leg.

Extension caused by phasic contraction of gluteus maximus, semimembranosus and semitendinosus, biceps femoris. (long head)

The *tibia* goes from a position of easy extension into complete extension due to the contraction of the entire quadriceps femoris and assisting extensors.

The *foot* from a position at right angles to the lower leg goes into dorsal flexion due to the force of weight bearing, steadied by the tonic contraction of lateral ankle stabilizers (peronii balancing the tibialis anticus and posticus) and restrained by the lengthening contraction of the gastrocnemius, soleus, flexor digitorum longus, and flexor hallucis longus.

Left Leg

The *femur* goes from a position of (a) slight abduction, (b) no rotation, (c) very slight flexion into a position of (a) slightly increased abduction, (b) slight rotation outward,

The *femur*, instead of being in a neutral position, starts in slight inward rotation, which is its usual position in the case of weak pronated feet. As the phase progresses the internal rotation becomes more marked with a strain placed on the external rotators, obturator externus, and superior and inferior gemelli.

The constant strain on the internal side and pinching on the external side of knee joint is increased as extension progresses. The vastus lateralis is stronger than the vastus medialis.

The dropping of the talus and inward rotation of the os calcis causes the lateral ankle joint stabilizers to balance the foot in an everted and pronated position (since the tibials are on stretch and elongated.) This condition results in a persistence of the deformity.

The *femur* due to the pronation of foot is in slight inward rotation, which it loses as the phase continues. It probably never reaches the normal amount of external rotation. The

WALKING—Phase I (cont.)

STRONG NORMAL FEET

(c) moderate flexion, due to the following forces:

Abduction maintained by gravity rather than muscular contraction.

Flexion largely due to psoas major and rectus femoris, assisted by the abdominals.

Outward rotation by psoas major, obturator externus, and gemelli.

The *tibia* from slight flexion goes into greater flexion on the femur due to gravity but assisted by the biceps, semimembranosus, and semitendinosus, followed by quick extension due to the action of the entire quadriceps femoris. (In the absence of the quadriceps due to paralysis this movement can be effected by gravity if the femur is sufficiently flexed on the pelvis and then quickly allowed to extend.)

The *foot* from a right angle position maintained against gravity by the static action of the *tibialis anticus*, *extensor digitorum longus*, *extensor hallucis longus* on the medial side, balanced by the *peronii* on the lateral aspect, goes into dorsal flexion due to the phasic contraction of these same muscles.

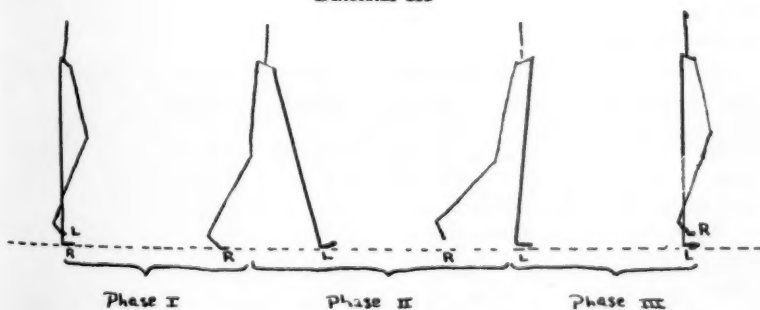
WEAK PRONATED FEET

weakened external obturator and gemelli are less effective. Movement is probably effected largely by psoas major.

Since the knee joint is stretched on its medial aspect and pinched on the lateral, the *tibia* flexes on the femur largely by the action of the lateral flexors (*semimembranosus* and *semitendinosus*) and again is extended largely by the action of the *vastus lateralis* at the expense of the *vastus medialis*.

Action in the foot is the same except perhaps that the *peronii*, which tend to pull the foot into eversion and abduction, may respond more readily than the stretched *tibialis anticus*.

DIAGRAM III



WALKING—Phase II

Phase II.—From the first contact which the left heel makes with the ground, throughout the transfer of weight to the left foot until contact with the ground is lost by the toes of the right foot. Diagram 3.

STRONG NORMAL FEET

WEAK PRONATED FEET

Right Leg

The *femur*, from a position of strong extension, flexes slightly, maintains its inward rotation but becomes slightly abducted instead of adducted as the weight is taken on the left leg.

Extension due to phasic contraction of all hip extensors is followed by flexion due to gravity and a slight relaxation of the extensors.

Abduction due to the action of *gluteus medius* and *minimus*. In the later period of the phase following the transfer of weight gravity maintains the abduction.

The *tibia*, from a position of extension on the femur, begins to flex due to the contraction of the *gastrocnemius* and hamstrings assisted by gravity.

The *foot* plantar flexes on the lower leg due to the contraction of the soleus and *gastrocnemius*, aided by the lateral stabilizers of the ankle joint (*peroneus longus* and *brevis* against the *tibialis posterior*, *flexor digitorum longus*, and *flexor hallucis longus*). The greater the vigor of the walk the stronger this action in order to give the push off.

Within the foot the long and transverse arches are depressed slightly due to weight bearing. During the push-off the arches rebound giving spring to the walk, owing to the contraction of the *tibialis posticus*, *flexor digitorum longus*, *flexor hallucis longus*, balanced by the *peronii longus* and *brevis*, and also due to the tension of the elastic fibers of the spring ligament.

The *femur* maintains its abnormal inward rotation with stretch on the *obturator externus* and *gemelli*.

Action the same except for the fact that the greater amount of body weight is supported by the lateral condyles of femur and tibia.

Action same except for the stronger action of the external lateral stabilizers (*peronii longus* and *brevis*).

The arches of the foot are permanently depressed. The push-off lacks spring. The plantar calcaneonavicular ligament lacks resiliency due to its long-continued stretch.

WALKING—Phase II (Cont.)

STRONG NORMAL FEET

The transverse arch recovers owing to the action of the transverse head of the adductor hallucis and of the quadratus plantae (reflex contraction following stretch.)

Left Leg

The *femur* maintains its outward rotation; extends, owing to the contraction of the biceps, semimembranosus, semitendinosus, and gluteus maximus; and goes from slight abduction into slight adduction as weight is received by the leg, due to the force of gravity aided by the contraction of adductor magnus and brevis. (As the foot is fixed by weight bearing these muscles cannot produce further outward rotation.)

Extension of the *tibia* on the femur is maintained by contraction of the quadriceps femoris. As the phase continues the static contraction of the hamstrings maintains the knee joint in easy extension, preventing hyperextension.

The lateral and medial foot and ankle joint stabilizers are in balance.

The longitudinal and transverse arches depresses slightly as the weight is received on the left leg.

WEAK PRONATED FEET

The femur maintains its inadequate outward rotation.

Throughout the phase the external muscles are more active than the internal.

The peroneals overbalance the tibials, the extensor digitorum longus, and extensor hallucis longus.

As the arches are inelastic there is no give. The foot stays in an everted and abducted position with the ligaments and tendons undergoing strain.

WALKING—Phase III

Phase III.—With the weight entirely supported by the left leg, from the time the right leg is free of the ground until it hangs along side the left leg. Diagram 3.

STRONG NORMAL FEET

Right Leg

The *femur* remains slightly abducted but loses its inward rotation and flexes slightly from its completely extended position.

WEAK PRONATED FEET

Femur loses but slightly its inward rotation. Action of obturator externus and gemelli is weak.

STRONG NORMAL FEET

Flexion due to *psaos major*, *iliacus*, *rectus femoris*.

Outward rotation, to neutral point, due to phasic contraction of *obturator externus* and *gemelli*.

The tibia is partially flexed on the femur, enough for the foot to clear the ground, due to gravity assisted by the phasic contraction of the hamstrings and *gastrocnemius*.

Dorsi-flexion of the foot on the lower leg, in order to clear the ground due to static action of the *tibialis anticus*, *extensor digitorum longus*, *extensor hallucis longus* balanced by the *peroneus tertius* and possibly the *peroneus longus* and *peroneus brevis*.

Left Leg

The femur loses its outward rotation, increases in extension but remains adducted. The action is primarily due to the release of tension by the forward movement of the right leg, and to gravity.

The tibia remains extended on the femur, but is not stiff due to the balance of the flexors and extensors.

The stabilization of ankle and foot is dependent upon the tonic contraction of all muscles in these regions.

WEAK PRONATED FEET

The flexion is due more to the phasic contraction of the biceps than of the *semimembranosus* and *semitendinosus*.

Dorsi-flexion of the foot is unbalanced by the stronger action of the muscles on the outer side of the ankle joint (*peroneus tertius*).

Femur goes into its habitual inward rotation.

Continued strain on inner side of joint due to stronger action of *vastus lateralis* and biceps.

The *peroneals*, being shorter and stronger than the inverters of the foot, maintain balance in an everted position. Inner border of foot is lowered causing stretch of all medial structures of the foot.

SUMMARY AND APPLICATIONS

The condition known as weak feet cannot be described simply by saying that the arches are weak and low and in need of strengthening. Any change from the normal height of the arch (and this varies widely in different individuals) brings about changes in the foot, ankle, knee and hip joints as well as in the position of the lower back, and has a marked influence on the alignment of the legs for support of the entire body.

The weak foot is usually used in a toeing-out position (both ab-

ducted and everted). A projection backward through the mid-line of the big toe (Meyer's Line) falls entirely outside the foot instead of passing through the center of the calcaneus. The planter calcaneo-navicular spring ligament which, along with the plantar aponeurosis and the tendons of the tibialis anticus and tibialis posticus, forms the support of the long arch, is relaxed allowing the head of the talus to become depressed and displaced forward and medialward. Further relaxation of the plantar cuneo-navicular and tarso-metatarsal ligaments allows the entire medial border of the foot to lower, and the calcaneus to rotate inward.

The function of the talus and of the calcaneus is to transmit the body weight directly to the foot. The displacement and inward rotation respectively of these two bones is not without its effect upon the knee and hip joints, and the muscles responsible for their movements. The medial ligaments around the articulation of the tibia on the talus are stretched, and the medial condyle of the tibia is lowered.

Because of the weight-bearing forces, the tibia assumes a position of slight abduction on the upper leg. The medial aspects of the knee joint are consequently somewhat drawn apart, resulting in a strain on the tibial collateral ligament and the attachment of the medial semilunar cartilage or meniscus. In contrast to this separation of joint surfaces on the medial side of the knee joint, the lateral structures are required to bear a larger part of the total body weight, resulting in a pinching of the lateral semilunar cartilage. This condition necessitates a larger part of the body weight being transferred through the lateral condyle of the femur, and permits the femur to rotate inward at the hip joint.

The effects of these changes on the problem of weight bearing as a whole may be seen by dropping a plumb line from the anterior superior spine of the ilium. The center of the patella does not fall in line as it should but medialward. And furthermore the middle of the patella is no longer directly above the center of the foot but medialward, sometimes completely outside a perpendicular erected from the foot. Thus we have an abnormal condition of weight bearing which is augmented further by weight bearing and locomotion. Fig. 2 a-b.

The case of weak feet is usually further complicated by the lowering of the transverse or metatarsal arch, so that the distal heads of the second, third, and fourth metatarsals receive pressure with each step, while the fifth metatarsal in some cases bears no weight at all. Frequently the sesamoid bones, when present, become displaced upward between the first and second toes.

The implications of defective statics of the foot as regards the activities of locomotion are many and extremely important. Many muscles of the feet and legs are under constant strain, and are at a mechanical disadvantage when called into the performance of the various

phases of locomotion. In the foot the movements of flexion and extension on the lower leg are normally guided in the sagittal plane by the interaction of the peroneus longus, brevis and tertius on the lateral side and by the tibialis anticus and posticus, and the flexors hallucis longus and digitorum longus on the medial side. In the weak and pronated foot the tibialis anticus has lost much of its strength. The peronii on the lateral side overbalance the medial muscles and pull the foot further into abduction and eversion. The already weakened tibialis anticus undergoes greater and continued strain.

Proceeding to the knee joint we find the same general condition existing but a different group of muscles involved. The spreading of the medial side of the joint produces strain not only on the collateral ligament but on the tendons of the flexors and extensors located on the medial side (vastus medius, sartorius, semimembranosus, semitendinosus), whereas the muscles of the lateral side of the joint (vastus lateralis and biceps femoris) are shortened. The movements of flexion and extension are therefore performed largely by these lateral muscles at the expense of the medial ones, which tend to augment the muscle imbalance and aggravate the defect. This is evidenced by the flabby appearance and tone of the medial muscles of the thigh, which is frequently noticeable in cases of weak feet.

The muscles acting on the hip joint present some deviation from the normal. The position of internal rotation which accompanies weak feet means that the spiral fibers of the ischiocapsular ligament are put on stretch. The short external rotators, principally the external obturator and the gemelli, are in a stretched and weakened position.

This brief analysis of changes in the foot, ankle, knee and hip joints is intended to bring out the fact that a return to the normal strong position of the feet and retention of this position during locomotion is hindered by the development of an imbalance of the lateral and medial muscles of the entire lower limb, and that vigorous activity involving weight bearing has the effect of increasing the inequality of muscle strength and hence of aggravating the defect.

The unnatural stresses and strains on the lower extremity resulting from the weakened foot position are not without their effects on the nervous system, both in the form of wasted energy and fatigue and in the form of irritation and pain. These effects are frequently delayed in recognition by the individual, a fact which is responsible for overlooking their existence during early stages when remedy is best effected.

There is another aspect of the problem of the student with weak feet who participates in the unrestricted sports program. It is well known that the force required to produce acute injury is only slight in the case of a weakened joint when compared with the strain which a strong joint will withstand. It has long been observed that accidents and injuries are more numerous when the body both physically and

mentally is less alert in its adjustments to changes in the environment; and furthermore that recovery from such injury is less spontaneous when hampered by lowered resistance, local as well as general. How many of the injuries occurring in the physical education program are the result of slight accident on top of chronic strain we do not know. But there is no doubt that many injuries, especially to ankle and knee, could be avoided by a consideration and treatment of weak and pronated feet even when they give no discomfort to the individual.

The causes of weak and pronated feet are many; overweight, general fatigue, poor body mechanics, faulty habits of walking, and tight restraining shoes. Each case is, of course, best treated by direct reference to its cause. In no case, however, can vigorous running, jumping, quick starts and stops be construed as anything but detrimental forces leading to an aggravation of the condition. Acute conditions of strain must be relieved at once, usually most effectively by the use of adhesive strapping. Then habits of good body mechanics in walking must be established through (1) re-education, and (2) development of enough muscle strength in the specific muscles of maintenance of good arch and knee statics to insure the retention of the correct walk without conscious consideration. When this has been accomplished, the freer type of physical activity can be engaged in without further strain and injury. Programs for the achievement of these results are amply described in the literature on corrective physical education. No effort has been made here to cover this aspect of the problem.

If we can detect the symptoms of weak feet in the early stages, protect the student from further strain, and bring about a control and correction of the defects, we shall perform a service never fully appreciated except by those who have progressed to the more serious and intensely painful stages of foot defects.

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A Study of Safety in College Physical Education

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DURING the academic year 1931-1932, Dr. Frank S. Lloyd made a survey of physical education accidents in the secondary schools of the nation. In the following year the writer continued a similar study on the college level. This survey covered all accidents occurring to men and women in physical education activities associated with the program. In addition an intensive study was made of college football during the fall of 1932.

The problem of the thesis is to determine: (1) incidence, types, and severity of college physical education accidents, (2) causal and contributory factors of accidents, (3) the legal liability for such accidents, and (4) the establishment of guiding principles which would facilitate remedial safety procedures in physical education activities.

SOURCE OF DATA

Seventy-five women's colleges with a population of 74,225 students reported 507 accidents and 1,723 days lost from physical education classes. These institutions represented 15.4 per cent of all women enrolled in colleges during 1932.

Thirty-eight men's colleges having an enrollment of 68,472 reported 888 accidents and 1,367 physical education class absences. It is estimated that this enrollment is 13.4 per cent of all men registered in college during 1932.

In addition to the year-round survey study of men's and women's physical education accidents, an intensive study of college football accidents was made. This study covered 157 colleges having an enrollment of 131,416. It represented an estimated squad coverage of 21.1 per cent.

METHODS

The procedures used in the collection of the data involved two techniques: (1) receiving and coding of accident reports from college coöperating in the year-round survey and the coding of the football reports, and (2) the collecting of material which would relate to con-

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tributory factors. This last mentioned information was obtained through the use of questionnaires.

The accident report blanks for football and other sports were assigned a report number, coded as to institutional number, and assigned a code number for each item, in order that Hollerith cards might be prepared from the report blanks for tabulation.

The contributory accident data were obtained from responses to questionnaires. Two types of questionnaires were used; one was received from those colleges coöperating in the year-round survey, and, the second, somewhat different in nature, was received from those colleges reporting football accidents during the intensive survey of football in the fall of 1932.

From the responses received on these questionnaires, an accident rate per 1,000 exposures was figured for each institution. A days-lost rate was determined in the same manner. All colleges reporting a similar response to a specific question were grouped together, their accident and days-lost rate totaled, and the mean accident and days-lost rate for a specific response determined. A critical ratio technique was used to compare the means of the accidents and the days lost in order to determine whether a real difference existed between the means.

FINDINGS

I. Classification of Sports by Hazard.—In order to present a valid basis for comparisons, sports were ranked on accidents and days lost per 1,000 exposures. These exposures were computed from questionnaire returns. The arbitrary classifications presented below give a relatively accurate picture of degrees of similarity and difference to which sports are hazardous.

1. Women: Table I graphically shows the placement of sports according to their hazardousness.

2. Men: In Table II the arbitrary classification of sports will be found.

II. Classification of Designated Causes of Accidents.—The twenty-three causes of accident were arbitrarily placed under three headings: inadequate leadership, improper facilities and equipment, and causes due to the nature of the game. This grouping presented the following interesting conclusions.

1. Women: Inadequate leadership caused 149 accidents (29.3 per cent) and 506 days lost (29.3 per cent). Improper equipment and facilities accounted for 138 accidents (27.2 per cent) and 401 days lost (23.2 per cent), while causes due to the nature of the game numbered 220 accidents (43.5 per cent) and 816 days lost (47.5 per cent).

2. Men: Using the same classification as above it was found that with better leadership and more adequate facilities and equipment, 31

per cent of the accidents and 40.3 per cent of the days lost might be partially or wholly prevented. The remaining accidents (69.0 per cent) and days lost (59.6 per cent) would only be reducible by improvement of the present rules.

TABLE I
RANK CLASSIFICATION OF SPORTS BY DEGREE OF HAZARD
COLLEGE WOMEN

Accidents per 1,000 Exposures		Classification	Days Lost per 1,000 Exposures	
Sport	Inc.		Inc.	Sport
1. Apparatus	11.4	Very hazardous	42.7	Apparatus
2. Riding	10.1		33.1	Riding
3. Field hockey	7.8	Highly hazardous	25.2	Basketball
4. Basketball	6.9		24.7	Soccer
			22.2	Field hockey
5. Speedball	5.6	Hazardous	16.2	Tumbling and stunts
6. Games and relays	5.1		15.0	Deck tennis
			12.0	Track and field
			8.2	Games and relays
7. Lacrosse	3.3	Low hazard	7.3	Calisthenics
8. Soccer	3.1		6.3	Archery
9. Track and field	3.1		5.8	Lacrosse
10. Tumbling and stunts	2.9		4.3	Indoor baseball
11. Fencing	2.8		4.1	Golf
12. Indoor baseball	2.5		3.5	Dancing
13. Crew	2.4			
14. Deck tennis	2.1			
15. Badminton	1.2	Minimum hazard	2.3	Swimming and diving
16. Archery	1.1		2.0	Tennis
17. Golf	1.0		1.4	Speedball
18. Tennis	1.0		1.4	Crew
19. Dancing	.88	Negligible hazard	.6	Volley ball
20. Swimming and diving	.80		.0	Badminton
21. Volley ball	.68		.0	Fencing
22. Calisthenics	.64			

3. Football: When the thirty-one reported causes of accidents were classified as in the men's and women's groupings, it was evident that 23.6 per cent of the accidents and 23.8 per cent of the days lost might be reduced without changing the game at all, while we may predicate that 76.4 per cent of the accidents and 76.2 per cent of the days lost are to be expected with the game as it now exists. This conclusion is verified by the 1933 and 1935 findings which approximated the same figures.

III. Contributory Causes of Accidents.—

1. Women:

a) Accidents and days lost per 1,000 exposures are reduced in ninety-eight out of every hundred cases where a physical examination is given before the student is allowed to enter intramural competition.

b) The teacher with less than three years of experience has a slightly lower mean number of accidents per 1,000 exposures than those with more than three years of experience (in ninety-eight cases out of every hundred). This may point toward an improved emphasis on safety during the training period for the more recent graduates.

TABLE II
RANK CLASSIFICATION OF SPORTS BY DEGREE OF HAZARD
COLLEGE MEN

Accidents per 1,000 Exposures		Classification	Days Lost per 1,000 Exposures	
Sport	Inc.		Inc.	Sport
1. Football	87.9	Very hazardous	512.2	Football
2. Horse polo	11.2		74.7	Horse polo
3. Wrestling	10.7		24.7	Wrestling
4. Lacrosse	9.3	Highly hazardous	10.4	Crew
5. Soccer	6.1		7.5	Cross country
6. Crew	5.3		5.3	Heavy apparatus
7. Boxing	4.6		5.2	Soccer
8. Touch football	3.4		4.7	Touch football
			4.4	Baseball
9. Basketball	2.5	Hazardous	3.9	Boxing
10. Ice hockey	2.5		2.9	Lacrosse
11. Heavy apparatus	2.1		2.3	Basketball
12. Handball	1.6		2.2	Tumbling and stunts
13. Baseball	1.5			
14. Fencing	1.3			
15. Cross country	1.0	Low hazard	1.1	Ice hockey
16. Speedball	1.0		1.0	Track and field
17. Miscellaneous games	1.0		.9	Handball
			.9	Volley ball
18. Track and field	.7	Negligible hazard	.7	Miscellaneous games
19. Swimming and diving	.6		.6	Tennis
20. Calisthenics	.3		.3	Calisthenics
21. Games and relays	.3		.2	Swimming and diving
22. Volley ball	.2		.0	Games and relays
23. Indoor baseball	.1		.0	Speedball
24. Tennis	.1		.0	Indoor baseball
25. Tumbling and stunts	.1		.0	Fencing

c) Indirect safety instruction reduces the days lost in ninety-four cases in every hundred while direct safety instruction increases the days lost exposure rate.

d) The best procedure in reporting accidents, if days lost are to be minimized, is to send a written report to the chairman of the department.

e) In order to reduce the days lost incidence per 1,000 exposures the college administration should pay all costs.

2. Men:

a) The best procedure in cutting down accidents in intercollegiate

competition is either to have a coach select the squad or to have the individual selected through proficiency in intramural games.

b) The family or school physician's opinion proves to be better in the matter of excusing individuals from physical-education classes.

c) An examination by family doctors or a college physical examination is the best procedure to follow when determining a student's fitness for intramural competition if the accident rate is to be lower.

d) The use of student leaders reduces the accident rate. When they are used for the entire class instruction period, the accident and days lost incidence per 1,000 exposures is further reduced.

e) Indirect safety instruction is more valuable than direct instruction in reducing the accidents per 1,000.

f) The days-lost incidence is materially reduced if a physical educator or doctor renders aid rather than a student.

g) A doctor available at intramural and intercollegiate games and practices reduces materially the days-lost incidence.

h) A required physical examination for all periods (class instruction, intramural and intercollegiate) reduces the accidents and days-lost mean incidence per 1,000 exposures.

i) Where the college administration pays part of the costs or the college athletic association pays all, the days lost from injuries are reduced.

3. Football:

a) Four weeks of preseason training gives the lowest mean number of accidents.

b) Six to eight days of practice before the first scrimmage is the best procedure to reduce the number of days lost per 1,000 exposures.

c) Two days of fundamentals per week reduce the number of days lost.

d) Where not more than thirty minutes is devoted to scrimmage, the accident incidence per 1,000 exposures is lowest.

e) If a complete medical examination is given before the first game, both the accident and days-lost incidence is reduced nearly half.

f) Where the college athletic association pays all injury costs the days-lost incidence is materially reduced.

g) At least four years of coaching experience is necessary to reduce the days lost per 1,000 exposures.

h) The coach with only one year of experience has the highest accident incidence.

IV. *Summary of the Legal Status of the College.*—A synopsis of the legal data obtained reveals that only in rare instances are educational institutions held liable for their torts.

1. Private educational institutions which cannot claim immunity as charitable corporations are held to the same rules of liability as any other corporations.

2. Private colleges and universities which come within the purview of charitable institutions obtain immunity on four grounds:

a) The funds held in trust for educational or other charitable purposes may not be diverted to compensate persons who claim damages. In other words, funds dedicated to important public purposes are not to be diverted to private ends.

b) The theory that public policy requires the exemption from liability is based on the broad ground that public encouragement of educational institutions should be extended to protect them from tort responsibility. This is on the theory which is least technical and which is most directly related to considerations of the general social welfare.

c) The familiar principle of *respondeat superior*, which makes an employer liable for the torts of his employees committed while engaged within the general scope of their employment, applies only when the servant is working for the benefit of his master, and consequently has no application to charitable corporations, where the service of the employee is for the benefit of humanity, and not for the institution employing him. The college is liable for the injury caused by an instructor only where the institution has failed to use care in selecting competent persons.

d) The doctrine of implied waiver by which one who accepts the benefits of a charity waives his right to claim damages.

3. State institutions, in the absence of express statutory enactments, usually escape liability on the ground that they are public corporations, engaged in a strictly governmental enterprise, or on the ground that they are agents of the State itself, and thus immune from damage suits.

4. Naturally the person individually responsible for the wrong is always liable for his own tort. It is because such persons are often financially irresponsible, leaving the injured person without relief even though he wins a judgment, that the question of the liability of the institutions arises.

Achievement Tests in Volleyball for High School Girls

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INTRODUCTION

THE need for objective tests in volleyball has long been recognized. In two independent studies, the authors have attempted to set up tests for high school girls which will serve the following purposes:

1. Classification of students into groups of similar ability.
2. Measurement of pupil progress.
3. Diagnosis of individual differences.
4. Daily practice of skill elements.

It was decided to construct tests, administer them, and then to compare the results of these tests with subjective ratings in order to determine the extent to which these tests measure volleyball playing ability.

PROCEDURE

Study of Literature.—Experimentation with available tests¹ revealed the following weaknesses:

1. Use of elements foreign to the game situation.
2. Lack of objectivity.
3. Lack of reliability.
4. Requirement of equipment not found in the usual gymnasium.
5. Failure to distinguish between players in the upper ranges of ability.
6. Incorrect evaluation of placement areas.
7. Tendency to measure endurance rather than playing skill.

Activity Analysis.—For aid in deciding which elements of skill to include in our testing program, activity analyses were made of girls' volleyball. A frequency table was made of the number of attempts of the following skills: serve, overhand and underhand; volleys, overhand and underhand; setup to self; direct pass, no setup; recovery from the net; block; save; spike. Since the results of the frequency table, as shown in Table I, affirm the observations of the authors that the spike, block, and

¹ See Bibliography.

save are used a relatively small number of times by high school girls in the actual game situation, it was decided to construct tests in only the following skills; serve, setup to self, pass, volley, and recovery from the net.

Activity analyses were also made of three of the teams in the final round of the Mississippi Valley Volleyball Tournament for Men, held in Davenport, Iowa, March 14, 1936. An accurate comparison of the percentage of times each skill is used in the women's game and in the men's game cannot be made for the following reasons:

1. The "three hit" rule in men's volleyball does not exist in women's rules.
2. The ball may be played twice in succession by the same player in women's rules; that is not permitted in men's rules.
3. The length of game differs.
4. The superior musculature and height of men enables them to use the spike more advantageously.

TABLE I

ACTIVITY ANALYSIS OF WOMEN'S AND MEN'S GAMES SHOWING FREQUENCY OF ATTEMPTS OF SKILL ELEMENTS

		Skill Elements									
		Serve		Setup to Self	Direct Pass, No Setup	Volleys		Recovery from Net	Block	Spike	Save
Game		Under-hand	Over-hand			Under-hand	Over-hand				
Women	A	2	39	88	0	24	77	0	0	5	1
	B	0	60	110	0	51	127	18	0	12	4
	C	36	13	44	5	7	71	15	0	1	0
	D	35	11	58	7	6	88	12	0	3	1
Men	E	65	42	149	96	5	15	4	13	125	40
	F	61	42	133	128	2	9	2	31	122	34

Subjects.—The subjects for this study were unselected groups of 227 high school girls. Group A consisted of 47 girls of the tenth, eleventh, and twelfth grades, and group B of 180 girls of the ninth and tenth grades.

Criteria.—For our criteria, it was decided to use ratings of playing ability in the actual game situation. Before any tests were given, these ratings were made by four trained judges.

The reliability of the ratings was computed by correlating the sum of the ratings of two judges against the sum of the ratings of the other two for each subject. In group A, the correlation was .8814, which became .9375 when corrected by the Spearman-Brown prophecy formula. In group B, the correlation was .9141 and the corrected reliability was

.9552. This would indicate that the reliability is sufficiently high to warrant a feeling of confidence in the validity of the ratings.

Construction of Tests.—Factors influencing the construction of tests were objectivity, true game situation, simple administration, and economy of space and time. Of all the tests tried out, the four yielding the best results, as described in this report, are Repeated Volleys, Serving Test, Setup and Pass, and Recovery from the Net.

DESCRIPTIONS OF TESTS

TEST ONE: REPEATED VOLLEYS

Equipment.—

1. Balls.
2. Wall space.
3. Stop watch, checked by a jeweler.
4. Special court markings for this test:
 - a) A line ten feet long marked on the wall at net height, seven feet six inches from the floor.
 - b) A line on the floor, opposite the wall marking, ten feet long and three feet from the wall.

Test.—The player being tested shall stand behind the three-foot line, and, with an underhand movement, shall toss the ball to the wall. When it returns, she shall volley it repeatedly against the wall above the net line for fifteen seconds. The ball may be set up as many times as desired or necessary; it may be caught and restarted with a toss as at the beginning. If the ball gets out of control, it must be recovered by the subject and brought back to the three-foot line to be started over again as at the beginning.

This procedure shall be repeated until ten trials have been given.

Score.—The score for one trial shall be the number of times the ball is clearly batted (not tossed) from behind the three foot line on the floor to the wall above or on the net line. The score for the test shall be the sum of the five best trials out of ten.

TEST TWO: SERVING TEST

Equipment.—

1. Regulation court.
2. Regulation net.
3. Balls.
4. Special court markings for this test:
 - a) A chalk line across the court five feet inside and parallel to the end line.
 - b) A chalk line across the court parallel to the net, and twelve feet six inches from the center line directly under the net.
 - c) Chalk lines five feet inside and parallel to each side line, extending from the line under the net to line "(1)."
 - d) Chalked numbers in the center of each area to indicate its value:
 - (1) The space nearest the net in the center of the court, value: one.

- (2) The spaces on either side of this area, value: two.
- (3) The space directly behind space "one," value: three.
- (4) The spaces directly behind spaces "two" and on either side of space "three," value: four.
- (5) The entire end space farthest from the net, value: five.

Test.—The player being tested stands in the proper serving area in the court opposite the target and is given ten trials to serve the ball into the target in the court across the net. Any legal serve is permitted. Foot faults shall count as trials; "net" serves shall be re-served and do not count as trials. The scorer stands on a chair near one sideline about fifteen feet from the net.

Score.—The scoring is indicated in diagram 2. A ball landing on a line separating two spaces scores the higher value. A ball landing on an outside boundary line scores the value of the area the line bounds. Trials in which foot faults occur score zero.

	2	4	5
1	3		
2	4		

Court Markings for Serve Test. Numbers designate score for that area.

TEST THREE: SETUP AND PASS

Equipment.—

- 1, 2, and 3, as for Serving Test.
4. Two jump standards.
5. Rope thirty-two feet long.
6. Special court markings for this test:
 - a) Jump standards placed opposite each other, one on each sideline of the court, hereafter referred to as court one, at a distance of ten feet from the net.
 - b) Rope stretched between the jump standards, six feet from the floor.
 - c) Two chalk lines at right angles to and crossing the center line under the net, these lines to be marked ten feet from either sideline to a point directly below the rope, i.e., ten feet from the net, in court one and extending five feet into court two opposite, thus marking the front courts into three scoring areas.

Test.—The instructor stands in the center of court two and throws the ball over the net and the rope to the player in court one. The player being tested stands in center back position to receive the ball. She sets it up once to herself and attempts to pass it over the rope, between the rope and the net, into the scoring area marked "5." Any setup is permitted if it is legally executed. Ten trials shall be given.

Note: If, in the opinion of the instructor, a ball so tossed cannot be handled, this shall not constitute a trial.

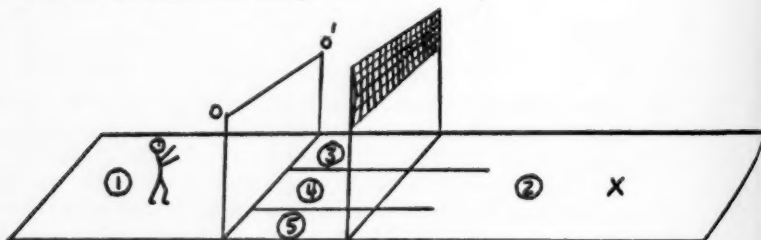
Score.—A ball passing over the rope and between the rope and the net, which lands on or within the boundaries of the scoring area to her right shall score five points.

A ball, passed as described, which lands in the center area or on the line between left front and center areas, shall score four points.

A ball, passed as described, which lands in the left scoring area or on the sideline bounding this area shall score three points.

A ball which passes over the net into the opposite playing court shall score two points.

A ball which is set up and passed, which does not go over the rope, but which, in the judgment of the instructor, could be played by another player in court one, shall score one point.



Court Markings for Test Three. Numbers in circles designate score for that area. o and o' are jump standards with rope connecting them at a height of six feet.

TEST FOUR: RECOVERY FROM THE NET

Equipment.—

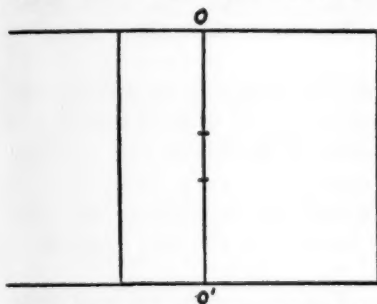
- 1, 2, and 3, as for Serving Test.
- 4, 5, 6, a, and b, as for Setup and Pass Test.
7. Special court markings for this test:
 - a) A square target woven with yarn in the exact center of the net. The diagonal of the square shall be two feet eight inches. The square shall be so placed that one diagonal shall be vertical, the other horizontal.
 - b) Two short marks on the floor ten feet from the line under the net: the one, four feet to the left of center, the other, four feet to the right of center.

Test.—The player being tested shall recover balls from the net and send them over the rope into the rear two-thirds of the playing court. She shall have twenty trials in succession, ten from the right and ten from the left, as follows:

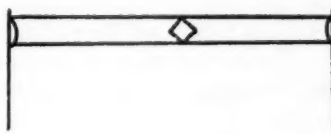
The instructor stands on the mark under the rope and to the right of center. From that point she sends ten balls with an underarm toss into the woven target on the net. The subject legally recovers the ball from the net and passes it directly, or sets it up once to herself and then passes it over the rope into the playing space beyond. The procedure is then repeated with the instructor standing on the mark to the left of center.

Note: A ball thrown into the net, but missing the target, shall not count as a trial unless recovery is successful.

Score.—One point is scored for each successful recovery in which the ball is sent over the rope into the playing area beyond.



Court Markings for Test Four. *o* and *o'* are jump standards with rope connecting them at a height of six feet.



Net Target for Test Four.

STANDARDIZED DIRECTIONS FOR ADMINISTERING THE TESTS

Two practice trials shall be given in tests two, three, four, and five. This is not necessary in test one, since the total of the five best scores out of ten trials is used.

Necessary equipment shall include: A regulation court² with serving area marked; as many properly inflated volleyballs² as possible; an unobstructed wall space at least ten feet high and ten feet wide; chalk lines, where used, one-fourth inch in width; and a regulation net.²

The net shall be strung so that when the bottom cord at the center is pulled two feet the tension of the net shall be five pounds, measured as follows: attach a spring scales to the exact center of the cord at the bottom of the net; place a mark on the jump standard at the height from the floor equal to the distance of the lower edge of the net from the floor and place the jump standard two feet from the center of the line under the net; when the net is pulled with the scales to the mark on the jump standard the reading shall be five pounds.

Note: For interpretation of volleyball terms refer to official Volleyball Rules.²

² Spalding's Athletic Library Number 115R, Athletic Handbook, (New York: American Sports Publishing Company, 1935-36.

RESULTS

*Group A*³.—From the results of the zero-order correlations of the criterion with the tests used in this study, it appears that the best single test for classifying is the Repeated Volleys Test with $r = .7162$. The Serving Test ranks second with $r = .6278$, the Setup and Pass is third with $r = .605$, and the Recovery from the Net is the lowest in the group with $r = .4227$.

The best combination of tests for classification is the Repeated Volleys and Serving Test which yield an $r = .8111$. Adding the other two test items to this combination resulted in $r = .8152$. This is a negligible increase when the length of time to administer the additional tests is considered.

*Group B*⁴.—The most useful single test in this group appears to be the Serving Test with $r = .5846$. Ranking second is the Recovery from the Net with $r = .5602$; third is Repeated Volleys with $r = .4332$; and fourth is Setup and Pass with $r = .4115$.

The combination of test one, Repeated Volleys, with test two, Serving Test, gave $r = .6064$. Adding test items three and four raised this to .6198.

The differences in the correlations of the two studies are in all probability due to the fact that Group A, composed of girls of tenth, eleventh, and twelfth grades, had had considerable volleyball experience and were tested in small groups while Group B, composed of girls in the ninth and tenth grades, had had very little previous volleyball experience and were tested, by necessity, in large groups.

CONCLUSIONS

1. The best combination of measures for practical purposes appears to be the Serving Test with the Repeated Volleys. This combination gives a higher degree of correlation with the criterion than does either item alone. The two tests measure quite different things. This combination is easy to administer since the Repeated Volleys test may be given along the walls while the Serving Test may be given on the court itself, if the floor space is large enough to permit administering and scoring both at the same time.

2. Because of simplicity of administering and scoring, and the economy in time and equipment, these tests may be recommended as teaching devices as well as tests for classifying and diagnosing.

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Diary Analysis: A Suggested Technique for the Study of Children's Activities and Interests

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INTRODUCTION

EDUCATION is an activity phenomenon. Children are dynamic organisms. Most of the child's education comes from direct learning by experiences having a maximum of lifelikeness. Knowledge of those activities in which children tend to participate joyously and spontaneously of their own volition seems indispensable to sound educational philosophy and method.

The genetic method and biological point of view are important to education because they are most apt to reveal that stage of maturation where optimum stimulation and response lead to the greatest change in behavior and therefore to the best education of the child.

Although the word "instinct" is nowadays being sedulously avoided, we must still recognize certain "unlearned cores" of behavior which tremendously influence learning. All children apparently desire security, social recognition, and the thrill of new activity and experiences. If given freedom, in what activities do boys engage to satisfy these fundamental desires?

Educational progress must, perforce, be largely dependent upon the degree of relationship existing between the activities of which children are fond and which are significant in their lives, and the recognition of these activities in the planning of a series of guided experiences (curriculum) for the education of children. Neither education nor civilization can long continue to violate biological laws without disintegrating society.

The teacher's interest must therefore be centered in children and their natural activities instead of in school subjects. As these activities become organized more completely, the usual school subjects develop as greater specialization and maturity take place.

Progress in education is marked by a continuous refinement of techniques for research with a resulting increase in reliable data. Our tools are yet crude. The activities of a normal junior high school boy are so numerous and varied that observation alone is very expensive, impracticable, and gives only a very incomplete picture. The key to many an

educational difficulty which might unlock the gate of truth may yet be found in closer scrutiny of child life as lived "on its own," according to its own plan. The analysis of children's diaries suggests possible techniques for studying both individual differences and child behavior in gross.

PURPOSE OF THE INVESTIGATION, SIGNIFICANCE OF THE PROBLEM,
AND PROBLEM STATED AND DEFINED

Purpose of the Investigation.—The laws of life demand that a child be active, free, and learn much directly from firsthand experience. The laws of man demand that he eventually become a satisfactory member of a machine-age community.

The central problem of education then becomes the effort to retain for adult life the splendid integration of the personality so evident in the spontaneous life of normal children who engage in coordinated activity both physical and mental.

Careful scrutiny must be made of the child's spontaneous play life for the purpose of seeing how it can best be united with the demands society makes upon him. All this for the purpose of preventing any disintegration of the stable childish personality. If the normal child, as Burnham insists, represents wholesome integration we must endeavor at all costs to preserve it. By and large the normal child is free from injurious repressions and inhibitions, self-consciousness and a number of interfering and inhibiting thoughts and feelings that constantly interfere with the activity of adults. If we are to employ the positive hygienic attitude of prevention in connection with mental hygiene and preserve the healthful attitudes of children, we must note the activities which are the concomitants of these attitudes.

It takes little to keep children happy and integrated if we can but find out those things which seem to be of prime importance to them and which they, therefore, consider significant tasks. We can then give some consideration to the preservation of these activities in our educational planning. The child must walk before he swims; he must talk before he reads. His spontaneous play life must be carefully scrutinized for possibilities of uniting it with society's demand that he eventually be made a satisfactory member of the community.

The adult does not belong in the child's world. Among the first things a child learns from his contact with adults is that he must be submissive, and submission to compulsion is inimical to play. It has been pointed out by Koffka that the child creates a world of his own, running parallel to the adult's world in which he is washed and dressed, put to bed, and made to keep quiet. Relief from this compulsory routine is sought in play where things take their own course and are subject to all kinds of curiously interesting changes and inconsistencies, quite unlike the teachers' or the parents' orderly ways of doing things.

It is the able teacher who senses and provides intelligent leadership in those situations in which the child finds a real interest because they are the child's own activities directing him toward his *own* conscious goals. In no other way can the child become courageous and independent and prepared to adapt himself to the group to which he belongs and to which he must make his contributions.

Often the insignificant part of education is that which is transacted between the faculty and the students, whereas the vital part is often purely a matter between one student and another in a situation that has evolved during efforts in a common task. The chief objection against authoritative education which ignores the spontaneous and natural interests of children is that it often undermines his courage and his independence and therefore his mental growth.

This preliminary study is designed to suggest possible techniques for determining what activities junior high school boys find interesting and, to them, worth while enough to devote to them considerable time and energy.

Problem Stated and Defined.—Stated specifically, the problem is to determine the nature of the activities in which junior high school boys engage during the first week of summer vacation when school bonds are definitely cut.

An effort will be made to answer tentatively the following questions:

1. In what variety of activities do junior high school boys tend to engage during the first week of a summer vacation?
2. Is there any significant difference between the activities of boys known as "actives" versus those known as "fringers"?
3. Is there any significant difference in the kinds of activities which these two types of boys say they "most enjoy"?
4. What factors tend most to cause emotional reactions in boys outside the school situation?
5. Is there any significant difference between the factors which tend to cause emotional reaction in the "actives" as compared to the "fringers"?

HISTORICAL STATUS OF THE PROBLEM

The historical method has been employed in the past to investigate such problems as psychological inheritance, including intelligence, degree of eminence, and social and economic status. The stories of the "Kallikaks," the "Jukes," "Heredity in Royalty," "American Men of Science" are representative of the early work of some of our pioneers in psychology and genetics such as Galton, Goddard, Dugdale, Wood, and Cattell.

The results of these studies are today accepted only tentatively and critically because of the methods employed. In the case of Goddard's study of the Kallikaks, the name of the seduced feeble-minded bar-

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maid was not even known. To get satisfactory data on heredity we realize today that we must work *forward* and not backward. In the latter operation, the data consists of considerable idle gossip about people.

With the advent of psychoanalysis came biographical studies in which the psychoanalytical method was employed. Jesus, Caesar, Napoleon, and many other great personalities were subjected to this method.

With later developments in endocrinology, biological studies of the personality became fashionable. The most recent to come to the attention of the author is a biological study of the personality of Dickens. In this study, the parathyroids, thyroids, adrenals, pituitary, and other ductless glands are held strictly accountable for much of Dickens' genius and shortcomings.¹

G. Stanley Hall can perhaps be called the "father of the questionnaire method" of gathering genetic psychological data concerning children's interests in collections, religion, ideas of the world about them. He did much to focus our attention upon the genetic development of these interests and ideas and upon the child's point of view.

The possibility of diary analysis first came to the attention of the author through the work of Charlotte Bühler which first appeared in 1921.² The analysis of fifty-two adolescent diaries, some of which extended over a period of two years, seemed to throw considerable light on many aspects of adolescent life.

With refined techniques, greater possibilities seem evident for determining dynamically the ingredients of life as far as any particular child is concerned as well as getting some clue to dominant behavior trends of large groups of children.

SELECTING THE SUBJECTS, COLLECTING AND ORGANIZING THE DATA

Selection of Subjects, Fringers and Actives.—The subjects in this study were junior high school boys of one Ludlow and four Springfield, Massachusetts, schools. For the purpose of another study they had been designated either as boys who entered whole-heartedly into the activities of the physical education program (actives) or as boys who were disinclined to participate freely (fringers).³ In the original study there were fifty actives and fifty fringers scattered among thirty-three different home rooms.

¹ H. B. Fantham, "Charles Dickens: A Biological Study of His Personality," *Character and Personality*, 11: 3 (Mar, 1934).

² Charlotte Bühler, *Das Seelenleben des Jugendlichen*.

³ Charles C. Cowell, *A Study of Differentials in Junior High School Boys Based on the Observation of Physical Education Activities*.

Collection of Data.—The data used in this study consisted of a seven-page diary representing the first week of the summer vacation.

The diary sheets were headed "My First Seven Days of Vacation." Each sheet contained three headings with adequate space for writing after each. The headings were as follows:

- (1) What I enjoyed doing.
- (2) What made me angry, sad, or unhappy.
- (3) The story of my day.

The boys were given a stamped addressed envelope and asked to mail the diaries a week later. They were instructed to sign them or leave them unsigned as they desired. Inasmuch as I had a key through handwriting and check-mark, it was possible to identify them readily if they were unsigned.

Having visited schools freely in my supervision of practice teaching, I was in fairly good rapport with all the students and assume that the cooperation was free and the reports reliable.

Seventy-five per cent of the diaries were returned but only 50 per cent were complete enough to make comparable studies between "fringers" and "actives."

With but twenty-five "fringer" diaries and twenty-five "active" diaries available for analysis, the results, at the outset, must perforce be considered only suggestive and tentative.

Organization of Data.—The problem of properly classifying activities in which the various boys engaged was an immediate one. It was desired to distinguish social activities (those engaged in with one or more other people) from individual activities (in which the boy was engaged by himself alone). Wherever no mention was made of another person or persons, the activity was classified as an individual activity.

For the purpose of classifying activities engaged in, nine different headings were employed as follows:

1. *Social construction, experimental or exploratory activities.* Criteria for classification:

- a) Anything constructed with one or more other people (making a weather-vane, building a hut, building a boat, etc.).
- b) Any apparently new venture bordering on the scientific (taking apart an auto, exploding carbide gas in a tin can, making "bean hole" beans out of doors, etc.).
- c) Any natural science venture (exploring a cave, hunting mud turtles, etc.).

All of the above, to be classified as social, had to be engaged in with one or more other people.

2. *Individual construction, experimental or exploratory activities.*

Same as above with the exception that no mention was made of another person in their account.

3. *Big-muscle social game activities* (competitive). Criterion for classifi-

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cation: Any group activity in which a score was kept and someone won and someone lost. (Baseball, golf, tennis, horseshoes, etc.)

4. *Big-muscle social activities* (non-competitive). Criterion for classification: Any big-muscle activity engaged in with one or more other people where no organized competition was intended (swimming, playing "catch," social dancing, hiking, etc.).

5. *Individual big-muscle activity*. Criterion for classification: Any big-muscle activity engaged in where no reference was made to any other person (walking, bicycle riding, etc.).

6. *Social intellectual activities*. Criterion for classification: Any non-big-muscle activity engaged in with one or more others (playing cards, going to a concert, scout meeting, etc.).

7. *Individual intellectual activities*. Criterion for classification: Same as above with the exception that no reference was made to other people (reading, listening to radio, going alone to movie).

8. *Watching others in activity*. Criterion for classification: Any direct statement that others were "watched" doing things with evident interest (watching professional ball game, watching movers, watching sister make fudge, etc.).

9. *Work*. Criterion for classification: Any activity apparently not carried on under its own drive but ordered from without (housework, carrying coal, beating rugs, chopping wood, cleaning the garage, etc.).

Two complete classification sheets were kept; one for "actives" and one for "fringers." On each sheet activities mentioned as having been "most enjoyed" on any particular day were check-marked. This made the comparative study between "fringers" and "actives" possible as well as a consideration of the gross items.

Emotional Inventory.—The items listed under the heading "What made me angry, sad, or unhappy" were also classified for "fringers" and "actives" respectively. These were then scrutinized from the standpoint of whether or not the emotional reaction was caused by an evident clash with another personality or by some reason other than a social affront, the purpose of this being to get some possible clue to lack of social adjustment.

Items such as the following were checked as "social affronts":

Tried to sell a *Saturday Evening Post*. He sold none. Another boy sold sixteen. The man "fired" him. He was glad to quit because people had been unpleasant to him.

Father over-critical when boy tried to help with car.

Manager of the baseball team asked him to chase most of the balls while others played.

Boy stepped on his tennis racquet.

Boys threw mud on him.

Cousin took air out of his tire and he had to walk two miles to a gas station.

Some of the items not dealing with personalities were such as the following:

Started to rain when on his way to swimming.

Went fishing; caught only a "shiner."

Had to mind baby; couldn't swim.

Got grease on trousers while helping man repair auto.

ANALYZING THE DATA. HOW DO JUNIOR HIGH SCHOOL BOYS TEND TO SPEND THEIR FIRST WEEK OF SUMMER VACATION?

Gross Results.—(Total Activities) Table I gives the gross results pertaining to the nature of the activities of all fifty boys regardless of whether they were fringers or actives. It can be readily noted that the activities holding the two highest ranks are big-muscle social physical education activities. When all activities which can be legitimately classed as physical education activities are totalled they represent 39 per cent of all activities the boys mentioned. This does not include the activities of others in which boys were interested enough to watch, although many of these activities were athletic activities. Actual participation is alone included.

TABLE I
HOW TWENTY-FIVE FRINGERS AND TWENTY-FIVE ACTIVES COMBINED
TENDED TO USE THEIR TIME

Rank	Activity	Per Cent of Times Activities Mentioned by All	By Fringers Alone	By Actives Alone
1	Big-muscle Social Game (Competitive)	19	5.5	13.5
2	Big-muscle Social (Non-Competitive)	15	10	5
3	Work	13.5	8	5.5
4.5	Individual Construction, Experimental and Exploratory	13	7.5	5.5
4.5	Individual Intellectual	13	6.5	6.5
6	Social Intellectual	7	2.5	4.5
7.5	Social Construction, Experimental and Exploratory	6.5	3.5	3
7.5	Watching Others in Activity	6.5	3.5	3
9	Individual Big-Muscle	5	2.5	2.5

Table II represents a questionnaire result from the two following questions:

If you had your choice between playing some game on a team or going to a "movie," which would you prefer to do?

What would you rather do, read a good book or make something in the shop or in your backyard?

These questions were asked of ninety-four boys including the fifty used in this study.⁴ The gross results of the diary corroborate the ques-

⁴ These questions were asked about a month before the vacation period began.

tionnaire results. If the boy can't play on a team with others of equal skill, he will endeavor to play "catch" or make an attempt to satisfy his desire for social recognition and action in whatever ways are left open to him, but *his evident desire is to play on a team*.

Of the 13 per cent of the activities engaged in which were classed as "individual intellectual," about 6 per cent involved reading books or magazines whereas out of the 13 per cent of the activities engaged in as "individual construction, experimental or exploratory," about 12 per cent were purely constructive activities. The results of the diaries are here again corroborated by the results of the questionnaire.

Boys of the junior high school age crave action, and even when they read, they prefer to read about action.

TABLE II

QUESTIONNAIRE RESULTS FROM NINETY-FOUR BOYS OF WHOM HALF WERE ACTIVES AND HALF WERE FRINGERS

Situation	Percentage of Boys in Favor
Preferred playing a game on some team to going to a movie.	94
Preferred going to movie rather than playing on a team.	6
Preferred reading a good book to making something in the shop or backyard.	36
Preferred making something to reading a good book.	64

Gross Results.—(Of activities mentioned as "Most Enjoyed"). Table III indicates that over half the time the fifty boys engaged in competitive games they felt the experience to be the "most enjoyable" of the day. Almost half the times (.48) the boys engaged in the non-competitive social big-muscle activities, they reported the experience to

TABLE III

PERCENTAGES OF ACTIVITIES MENTIONED AS "MOST ENJOYED" IN PROPORTION TO DEGREE OF PARTICIPATION BY FRINGERS AND ACTIVES COMBINED

Rank	Activity	Per Cent of Time Mentioned as "Most Enjoyed"	By Fringers Alone	By Actives Alone
1	Big-muscle Social (Competitive)	54.5	23.5	31
2	Big-muscle Social (Non-Competitive)	48	29	19
3	Watching Others in Action	47	20.5	26.5
4	Individual Construction, Experimental and Exploratory	38	16.5	21.5
5	Social Construction, Experimental and Exploratory	34.5	16.5	18
6	Individual Big-Muscle	21.5	17	4.5
7	Individual Intellectual	17	8	9
8	Social Intellectual	16	11	5
9	Work	3.5	1.5	2.5

be the "most enjoyable" of the day. Swimming was the chief activity responsible for this enjoyment.

It is interesting to note that almost half the times (.47) the boys reported doings which could be classified as "watching others in activity," they reported it as the most enjoyable experience of the day. In most cases this meant watching skilled people in action, baseball players, archers, furniture movers, mechanics, etc.

The educational implications and further tentative interpretations appear later in this study.

Comparative Results.—(Actives versus Fringers). In order to determine trends of differentiation between actives and fringers as regards the nature of the activities in which they tend to participate and which they enjoy most, the critical ratio of the difference between the percentage of all possible times a given activity was mentioned by an active and the percentage of times it was mentioned by a fringer was determined. *With the small number of cases, it was realized at the outset that the critical ratios would be fairly small and the results therefore tentative.*

The formulas employed were:

$$D = P_A - P_F$$

$$\sigma_{P_A} = \sqrt{\frac{P_A Q_A}{N_A}}$$

$$\sigma_{P_F} = \sqrt{\frac{P_F Q_F}{N_F}}$$

$$\sigma_D = \sqrt{\sigma_{P_A}^2 + \sigma_{P_F}^2} = \sqrt{\frac{P_A Q_A}{N_A} + \frac{P_F Q_F}{N_F}}$$

$$C.R. = \frac{D}{\sigma_D} = \frac{P_A - P_F}{\sqrt{\frac{P_A Q_A}{N_A} + \frac{P_F Q_F}{N_F}}}$$

Where P_A is the percentage of times an item was checked for actives,

P_F is the percentage of times an item was checked for a fringer,

D is the difference of these per cents,

σ_P is the standard error of a per cent,

σ_D is the standard error of the difference of two uncorrelated percentages, and

C.R. is the critical ratio of the difference.

⁵ G. Udny Yule, *An Introduction to the Theory of Statistics*, (1924), p. 257, Formula (2).

⁶ Harold A. Edgerton and Donald G. Patterson, "Table of Standard and Probable Errors of Percentages for Varying Numbers of Cases," *Journal of Applied Psychology* X: 3 (Sept., 1926).

Table IV gives the critical ratios of the percentage differences between the number of times the fringers and actives respectively participated in various activities. Since the critical ratios should be at least three for statistical reliability, the results, although they must be considered suggestive and tentative because of the small ratios (due, in part, no doubt, to the small number of cases), are indicative when considered in connection with other statistically reliable data available on the same boys.

The highest critical ratio (1.46) favoring actives dealt with their greater tendency to engage in big-muscle social games of a competitive nature than did fringers.⁷

The highest critical ratio (1.00) favoring fringers dealt with their greater tendency to engage in big-muscle activities of a social but *not* of a competitive nature. Swimming, playing "catch," hiking, and like activities were frequently mentioned.

TABLE IV

FREQUENCY WITH WHICH FRINGERS AND ACTIVES ENGAGED IN THE VARIOUS ACTIVITIES AND CRITICAL RATIOS OF THEIR PERCENTAGE DIFFERENCES

Activity	Total Times Mentioned		Percentage of Total		Percentage Differences Between F & A		Critical Ratio
	Fringers	Actives	Fringers	Actives	Fringers	Actives	
Social Construction, Experimental or Exploratory	30	25	7	6	1		.14 F
Individual Construction, Experimental or Exploratory	66	51	15	11	4		.40 F
Big-Muscle Social Game (Competitive)	47	126	11	27		16	1.46 A
Big-Muscle Social (Non-Competitive)	85	47	20	10	10		1.00 F
Individual Big-Muscle	23	22	5	5	0	0	0
Social Intellectual	23	37	5	9		4	.57 A
Individual Intellectual	58	59	13	13	0	0	0
Work	71	87	16	11		5	.50 A
Watching Others in Activity	29	26	7	6		1	.14 A
Totals	432	480	99	98			

Key: A, Favoring Actives; F, Fringers.

⁷ Statisticians usually accept a ratio of 3 as being statistically significant, but a critical ratio of 2 leaves only 456 chances in 10,000 that the difference is due to chance.

The actives, on the other hand, were much oftener members of an integrated social group (team) whose members had a common goal.

Table V dealing with indications of what activities boys found most enjoyable gives somewhat higher critical ratios.

TABLE V
FREQUENCY WITH WHICH FRINGERS AND ACTIVES SAID THEY "MOST ENJOYED" A
GIVEN ACTIVITY AND CRITICAL RATIOS OF THEIR PERCENTAGE DIFFERENCES

Activity	Total Times "Most Enjoyed"		Percentage of Total Times Mentioned		Percentage Differences Between F & A		Critical Ratio
	Fringers	Actives	Fringers	Actives	Fringers	Actives	
Social Construction, Experimental or Exploratory	10	9	33	36	3		.33A
Individual Construc- tion, Experimental or Exploratory	22	22	33	43	10		.71A
Big-Muscle Social Game (Competitive)	22	78	47	62	15		1.07A
Big-Muscle Social (Non-Competitive)	49	18	58	38	20		1.43F
Individual Big-Muscle	7	2	34	9	25		2.27F
Social Intellectual	5	4	22	10	12		1.20A
Individual Intellectual	9	11	16	18	2		.18A
Work	2	5	2	5	3		.43A
Watching Others in Activity	12	14	41	53	12		.86A
Totals	138	163					

Key: A, Favoring Actives; F, Fringers.

The highest ratio favoring fringers (2.27) showed a tendency for them to enjoy individual big-muscle activities more than do actives. They likewise tend to enjoy the non-competitive big-muscle social activities more than do the actives. The actives, on the other hand, found competitive social games to be more enjoyable than did the fringers. There is a slight tendency for actives in general to get greater enjoyment out of their activities than do fringers with the exceptions of such individual activities as walking alone, playing golf alone, or playing in larger groups where no organized games are in progress; where skill is not so necessary for adjustment.

These tentative indications are corroborated by the statistical find-

ings of a recent study by the author, pointing out some of the personality differentials and behavior trends of these two types of boys.⁸

Emotional Experience.—Table VI gives the data concerning the types of emotional reactions experienced by the two types. Although the emotional reactions of fringers and actives tend to be similar in number, they tend to differ rather definitely in kind. Here the critical ratio approaches greater reliability at 2.45.

More frequent unpleasant experiences due to conflicts with other per-

TABLE VI

FREQUENCY WITH WHICH FRINGERS AND ACTIVES HAD NOTICEABLE EMOTIONAL EXPERIENCES AND THE CRITICAL RATIO OF THE PERCENTAGE DIFFERENCE BETWEEN FRINGERS AND ACTIVES WHOSE EMOTIONAL RESPONSES WERE DUE TO AFFRONTS FROM OTHER PERSONALITIES

Total Emotional Experiences Mentioned		Total Social Affronts		Percentage Difference Between Fringers and Actives		Critical Ratio
Fringers	Actives	Fringers	Actives	Fringers	Actives	
82	78	29	6	35	8	2.45

sonalities are in evidence. This evident social maladjustment present in the fringer type was also definitely observed in the study previously referred to.⁹ Motor skill, physique, and dynamic energy drive are very important personality differentials which make for social acceptance among boys at the junior high school levels.

GENERAL SUMMARY AND TENTATIVE CONCLUSIONS

1. Over one-third of all the activities engaged in by the boys in this study were large-muscle physical education activities.
2. Over one-half of the experiences which the boys in this study mentioned as being "most enjoyed" were social big-muscle activities.
3. Boys designated as "fringers" by teachers of physical education tended more often to engage in non-competitive social play activities than did "actives."
4. Boys designated as "fringers" tended to get much more enjoyment out of individual non-social play activities than did actives.
5. Fringers tended to get more enjoyment out of the non-competitive social play ventures than did actives. The latter got more enjoyment out of competitive team games than did the fringers.
6. Although "watching others in activity" formed only 6.5 per cent of the total activities engaged in and ranked 7.5 on the list, it ranked third among the activities "most enjoyed." It is evident that boys of

⁸ Cowell, *op. cit.*

⁹ Cowell, *op. cit.*

both types got real enjoyment out of watching skilled performers, particularly when the latter were engaging in activities the boy himself would like to try (and often did at a later date.)

7. Experiences which tended to make boys angry, sad, or unhappy are much more apt to be the result of clashes with other personalities in the case of fringers than with actives.

8. Fringers tend to lack social self-confidence as shown by their tendency to avoid the cooperative group ventures and by their social maladjustment in often being unhappy in their contacts with other boys.

9. Only one boy in fifty mentioned that he had made an effort at creative writing during the week.

10. Large scale analyses of more complete children's diaries offer valid and valuable means of studying children's activities and interests.

THEORETICAL DISCUSSION AND POSSIBLE APPLICATION OF FINDINGS

The normal child exhibits his highest form of integration in his conscious attention to tasks of his own choosing. He delights in action which involves his whole organism. This type of action gives him the greatest pleasure and therefore he spends most of his time at it. It is the playing *at doing* which gives children satisfaction. If they cannot engage in activity they like to watch others. If denied this privilege, they read about people in action. The play of children affords the normal mechanism of release for imagination. If children do not know how to use their hands to construct, or lack game skills, or have no techniques for playing with other children, then reality has no chance to check fantasy and a dangerous kind of inactivity and rumination results.

The attitude of a child to his playmates is an essential index to his character. Children of the "fringer" type, whose false inner security is manifestly a defense against closer social contact with their mates, seem actually to avoid these contacts. They lack self-confidence in social relations.

Without participation in plays and games the child has little opportunity for failure, success, risks, or thrills which make for an accumulation of experience that builds morale. In a broad sense, mental hygiene, and therefore education, is morale building. It deals with life as affected by or dependent upon such mental factors as zeal, spirit, hope, confidence, and the like.

It is of interest to note that, outside of reading, few of all the various activities listed by the boys in this study seemed to grow out of what they did in school. Conversely, it is probably true that the school often developed unfortunate inhibitions in these same boys by robbing them of legitimate tasks in which they had a very vital interest and out of

which they might have developed very wholesome and integrating mental attitudes.

Emphasis upon the acquisition of knowledge rather than upon the development of wholesome mental attitudes tends to belittle such experiences as the following listed by boys as being "most enjoyed":

Building a hut	Baking "bean hole" beans
Laying out a ball diamond	Making a tent
Building a boat	Repairing a fishing rod
Helping neighbor fix his car	Taming a squirrel
Making an end table	Making a tarzan swing
Fishing	Making a key
Hunting turtles	Building a dog house
Hunting for "night-crawlers"	Making candles
Swimming	Looking through a telescope
Baseball	Playing with rabbits
Tennis	Cooking supper
Haying	Painting a bicycle

Uncontrolled emotion is a disintegrating influence for both adult and child. Failure in one's work, failure to be understood, being thwarted in one's activities, being ridiculed by others are inimical to the development of wholesome mental attitudes.

People and things alike thwart us in action. The result is emotional response. Children, because they tend to live from day to day and forget their grudges, are free from many of the inhibiting and interfering emotional reactions of adults. Each day to them is more or less a "tabula rasa."

The inventory of events which made for sadness, anger, or unhappiness in these boys could be summarized in the one word "thwarting," illustrated by some of the following non-personality factors:

- Rained; couldn't go fishing.
- Windy; couldn't swim.
- Had to stop ball game to work at home.
- Bicycle tire blew out.
- Broke a horse shoe and had to stop game.
- Had to wash dishes.
- Dog chewed up his fire crackers.

The fact that for the fringers other personalities were much more often the sources of irritation is of educational significance from the standpoint of diagnostic and remedial physical education. The processes by which the individual becomes a participant in his group, adjusts to it, and builds some semblance of socialized conduct and personality should be the chief concern, not only of social psychology but of physical education as well. It is in the latter groups that the child can be studied in his natural setting without the elimination of many factors which govern his reactions.

Physical education's greatest opportunity apparently lies in the orientation of its activity toward the mental hygiene point of view and in its opportunity to study the child as a "whole" and "free" agent in a world of stimuli both animate and inanimate.

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A Study of the Mechanics of Graceful Walking

By RUTH BASS

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INTRODUCTION

IN STATING very definite purposes of this study, as in the next section, I realize that back of these purposes there was, for me, a more motivating one, that of answering for my own satisfaction the question of whether or not it is possible to find a means through which university women will consciously consider the matter of carriage as really vital and meaningful.

There is an old proverb, familiar to all: "You can lead a horse to water, but you can't make him drink." It seems to me that we have increased the difficulty of our problem in posture even past the situation pictured in this proverb. We have been trying the dragging process rather than the leading one, and I doubt seriously the effectiveness of our procedures compared with what this effectiveness might be were we to use a good psychological approach to the problem. We study the innate emotional characteristics of the human and then proceed to disregard some of those that are most vital from the standpoint of educational guidance relative to our posture programs.

We, in the field of physical education, make no attempt to correct the posture that results from structural change. We consider, in our corrective gymnastics, only those who are functional cases. This classification really should include the majority of us, but we usually disregard all but the glaringly poor. We then proceed to practice a bit of very poor psychology. We take the "correctives" out of regular activities, segregate them with others of marked difficulties, and proceed to give them a series of uninteresting exercises two, three, or more times per week.

Having come through the process of correcting my own posture, and having taught the conventional corrective classes both in practice and theory, I speak with a bit of feeling on the subject. I am appealing, then, for a more meaningful approach now available to us.

The moving picture, obviously, presents to the university woman a good psychological approach to the matter of carriage. It is on a level with the phonograph as a reproducing instrument in vocal correction. The moving picture offers a meaningful appeal with stress on such

fundamental emotional characteristics and sentiments as curiosity, desire for approval, aesthetic appreciation, self-regard, and desire for competition. With such drives, the whole individual is thrown into the work of correcting posture, and, apparently, results can be obtained in comparatively short periods of time.

In reading of the more technical procedures which follow, the importance of the psychological phase of the study should be kept in mind.

PURPOSE

The purely research purposes of the study were:

1. To study the walk of university women judged to be graceful.
2. To study the walk of university women judged to be ungraceful.
3. To determine the general and specific components of a graceful walk, and, if possible, to define such a walk.

SUBJECTS STUDIED

During the school year 1934-35, four hundred university women, for the most part freshmen and sophomores in health and physical education classes, were subjects. During the school year 1935-36, a similar group of five hundred women was studied. Each group included entrants from the upper classes.

In addition to these groups, an experiment in training for better walking was carried on with fifteen high school girls in an effort to use in a practical way the observations made in the major study. (A report of this study will be made at another time.)

PROCEDURE

Selection of the Graceful.—The graceful walkers were selected by holding a graceful walking contest. The first choosing of those who walked gracefully was done by students in their regular physical education classes. In their various groupings, the girls walked around in a circle. When any student thought that another might qualify, she called out her name and this student stepped to the center. All students in all classes had opportunity to be considered as candidates, and to help select those who might qualify. Through the process as described, approximately one hundred girls were chosen to enter the preliminary judging of the contest. Candidates from any group or from the campus at large were welcomed to enter for the preliminary judging.

This first elimination was done by a student judging committee composed of five men and five women chosen by the writer because they were excellent in art, music, or dance, and because they appeared to have an appreciation of graceful line and movement. This committee, through the method of *agreement of judges*, limited the number of

contestants to thirty-six in 1934-35, and to twenty-three in 1935-36, the difference in numbers selected depending on the agreement of judges.

The final judging was done by a faculty-student committee. In 1934-35 this committee was composed of fifteen faculty and six students, while in 1935-36 it was composed of fourteen faculty members and nine students. The faculty members were from the departments of art, biology, health and physical education, home economics, music, kindergarten-primary, physics, photography, psychology, speech, and the Dean of Women. All had shown an interest and understanding of the problem to be studied. Ten girls were selected each year as winners of the final contest.

Points Considered in the Judging.—The following points were considered important by the students in the physical education classes, and were suggested for consideration to the judges in the semi-finals and finals:

General

Ease.—There should be no unnecessary expenditure of energy. The body should not be stiff.

Poise.—Composure, general carriage, and balance are to be considered.

Smoothness.—There should be no jerkiness of movement, or exaggerated swaying of the body, or swinging of the arms or legs.

Timing.—The timing should be whatever is natural for the individual, not a studied slowness or a hasty speed.

Specific

Good body alignment.—Watch the relative position of the head, shoulders, hips, knees, and ankles.

Head.—The head should not be forced backward, nor pushed forward.

Chest.—The chest should be lifted—not a forced lift—giving an impression of airiness rather than one of rigidity.

Shoulders.—The shoulders should not be hunched forward or forced backward. They should move easily but not in an exaggerated manner.

Hips.—The hips should move easily, but not in an exaggerated swing. They should not be tilted up or down to extreme; nor should they be pushed forward or backward to extreme.

Back.—The back should be held apparently easily and naturally for the build of the person.

Abdomen.—The abdomen should be held apparently easily and naturally for the build of the person; not sagging and protruding, nor “sucked in.”

Legs.—The legs should swing easily from the hips without a choppy knee action.

Feet.—No definite suggestion was agreed upon for the feet. The results, however, show an agreement on the part of the judges (meaning all concerned in any part of the selection). Further comment on the feet will be found in a later section.

Arms.—The arms should be swinging slightly, but not in an exaggerated manner.

The Taking of the Moving Pictures.—Moving pictures were taken of the ten winners of the graceful walking contest for each year. These pictures were taken on the stage used for dramatic productions, and stage lighting was depended upon.

The following variations of direction of walking and of costumes were used:

1. Walking across the stage in formal dress.
2. Walking across the stage in a bathing suit and dress shoes.
3. Walking across the stage in a bathing suit with bare feet.
4. Walking directly toward and away from the camera in a bathing suit and dress shoes.
5. Walking as in (4) with bare feet.

Moving pictures were also taken of fifteen girls whose peculiarities of walk were considered worth studying—a number of these would be generally considered as ungraceful.

In addition to the moving pictures taken of the university women, as noted above, moving pictures were taken of fifteen high school girls in the minor study of training for better walking. Since these girls were chosen because of their poor antero-posterior posture, their pictures were also used in studying the mechanics of ungraceful walking. (While this group was chosen for its poor posture, antero-posterior, they were also selected for the additional qualification of being flexible, and able to assume an erect posture, though very evidently they were unable to hold it. Pictures, taken before a training course began with them and again after they had been pursuing this course for six weeks, give evidence of improvement for the group.)

Techniques Employed in Studying the Pictures.—The pictures were first studied when run through the projector at *normal speed*. Observations were made which grouped themselves under the following:

1. General alignment of the ears, shoulders, hips, knees, and ankles.
2. The action-reaction effects on the various members concerned.
3. The manner of carrying the arms, and their general position in relation to the body. (Particular attention was paid to the lower arm action.)
4. The manner of carrying the legs. (Lower and upper leg action were studied separately.)
5. The manner of using the feet, and their placement.
6. The "flow," or "jerkiness" of the general and the specific body movement, particularly in the inter-stride phase.
7. The timing of action on the part of the various members.

The pictures were then studied when run on the projector at *slow speed*. Observations were made as above.

The same procedure of study was followed, insofar as possible, when *stills* of the various phases of the double stride were thrown on the screen.

One of the most interesting, and apparently most profitable, means

of studying the moving pictures was through stick figures. The points of alignment, noted above, were marked on a still projection, and also the points of elbow and wrist. The outline of the foot was drawn and also a line through the point of contact with the floor for each foot. The points of alignment and the elbow and wrist points were then connected with lines. See Figures I and II.

From the stick figures composite pictures for five phases of a double stride were made both from six of the outstandingly good or graceful walkers and from six of the outstandingly poor or ungraceful walkers. These composite pictures were then studied for their characteristic differences. These differences will be noted in the conclusions.

Differences in the *angles of alignment* were also noted. This will also be found under the conclusions. Through actual measurement of these angles, definite characteristics of the good or graceful and the poor or ungraceful positions assumed in walking can be seen clearly.

CONCLUSIONS

It is interesting to note that the points listed by the students in health and physical education classes are also those most commonly emphasized by members of our profession in considering good posture. I consider that the points listed above may be termed the "popular idea" of graceful walking, since the selections were made and the points listed by students in health and physical education classes who had not been coached, and who had had no particular training in posture work or walking. The judges, also, would be said to hold the "popular idea," since very few were trained in corrective gymnastics.

The psychological approach to the study of walking is certainly much more interesting and meaningful to the university woman and the high school girl than the logical approach so much more commonly used in posture work. Therefore, it seems to me reasonable to expect that the psychological approach will give more immediate, as well as more lasting, results in this field.

Some definite characteristics of the grace and the ungraceful are apparent. A few are listed here:

The ungraceful girl tends—

1. To carry her arms back of her body.
2. To carry her arms in a jerky fashion, and in an angular relation to the body.
3. To have a peculiar lower arm carriage.
4. To have an exaggerated position of the head, usually carried forward at a marked angle, and to have an emphasized movement or jerk of the head.
5. To zig-zag the various members of her body, rather than to move them in harmony with the whole.

6. To exaggerate movements sideward and up and down, and combine these unharmoniously with those forward.

7. To have stiff feet that act as units, lacking in flexibility and forceful push. In some cases the feet are placed on the floor almost flat and are lifted in the same fashion—almost entirely lacking in drive.

8. To either hold the trunk rigid, thus inhibiting possible drive for arms and legs, or to push the hips forward, the shoulders back, lower the chest, and hold the head forward.

The graceful girl tends—

1. To move her various members in harmony with each other.

2. To move so that a particular point, as the tip of the shoulders, moves across the screen in a wave line, rather than in a zig-zag manner.

3. To carry her arms more nearly in general line with her body, swinging them as much in front as in back, and having them fairly in line with the body when the feet pass each other.

4. To have a vigor of arm swing and a vigor of leg swing.

5. To swing her legs from the hips with a sustained pushing of the body forward.

6. To lift the chest and head easily and strongly, giving an impression of "upness."

7. To place the heels definitely but easily and smoothly in a direct line, one with the other, and to transfer the weight forcefully, but easily and smoothly, from heel to toe and on into the next phase of the stride—the great toe giving a definite push-off.

8. To carry the head, shoulders, hips, knees, and ankles generally in good alignment as they swing through the mid-position of the stride;

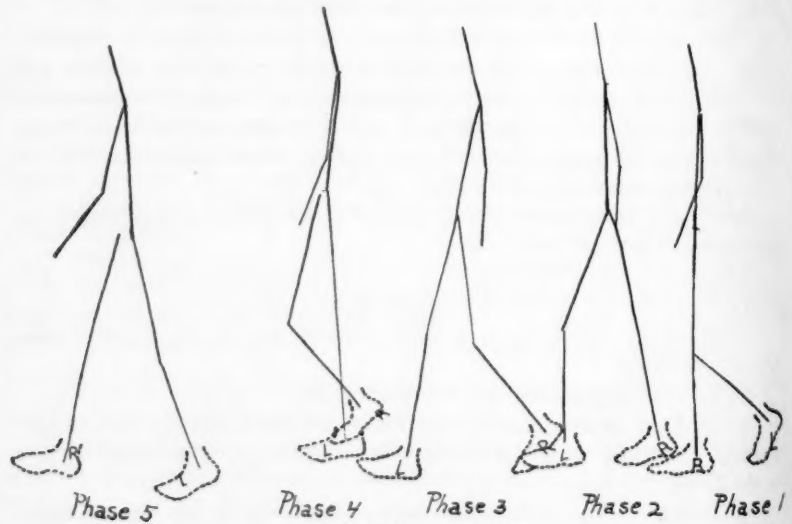


FIG. I. GRACEFUL WALK.

and to deviate *very slightly* from the alignment in changing from one phase of a stride to the next. This slight deviation is executed in a smooth fashion, in contrast to the jerky fashion of the ungraceful walk. The trunk is straight in the mid-stride position, and is inclined slightly forward or backward with the stride drive.

Graceful walking entails good carriage for all parts of the body, and forceful, easy, flexible movement. *Some* of the ungraceful were ungraceful chiefly in one respect, perhaps in foot work, perhaps in head,

TABLE OF ANGULAR MEASUREMENTS

Phase Graceful Figure I	Head-body* Angle	Head-hip† Angle
1	11	8
2	8	6
3	26	14
4	19	12
5	11	8
Ungraceful Figure II		
1	63	43
2	64	42
3	63	40
4	65	44
5	45	29
6	53	37

* The head-body angle was taken as the angle formed by lines drawn from ear to hip (1), and from ear to shoulder (acromion).

† The head-hip angle was taken as the angle formed by lines drawn from ear to shoulder (acromion), and an extension of the hip-(L)-shoulder line.

NOTE: These angles and lines are indicated for phase (2), Figure II.

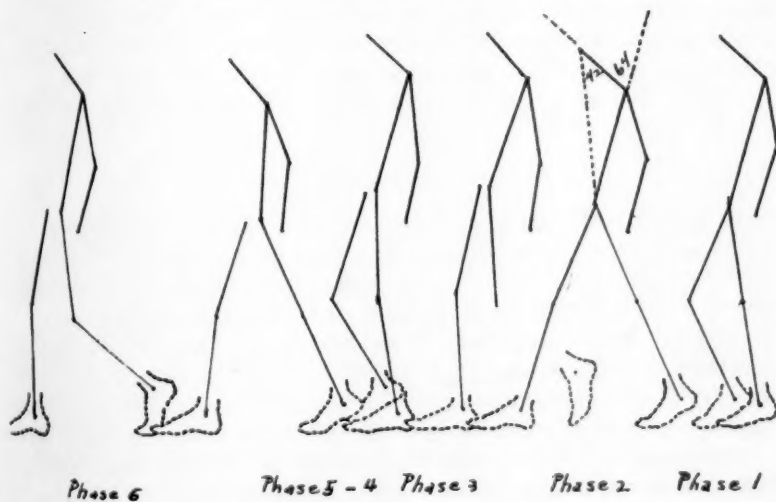


FIG. II. UNGRACEFUL WALK.

shoulder, hip position, in arm swing, or leg drive. Even the subject appearing as most ungraceful had a comparatively good foot drive. (I had expected to find the toed-out position as a typical tendency with the ungraceful, but this was not the case.)

The typical differences between the graceful and ungraceful are shown in angular measurements taken from stick figures. (Stick figures showing typical positions for the graceful and ungraceful appear in Figures I and II.)

It will be noted that the ungraceful walk, as shown in the stick pictures, has six phases in a double stride (left foot to left foot "take-off") while the graceful walk has five phases for the double stride. As noted earlier, this choppiness of step is usual in one type of ungraceful walk, the type which appeared most often in the particular subjects studied.

An unpublished study, by the writer, shows that, with a flexible group of poor posture girls of high school age, training in good carriage can be effective even in a short period.

A Measurement of Motor Ability in College Women

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INTRODUCTION

IN THE field of general education, it is commonly accepted that there must be some sort of grouping of students for most effective instruction. There are, of course, those who oppose homogeneous grouping of individuals on various grounds. A tabulation of opinions of a number of experts reveals the preponderance of opinion in favor of homogeneity.¹ Dissatisfaction with various types of sectioning of groups according to abilities has in general been due to failure of the teacher to differentiate in methodology among the groups.

Accepting grouping of those of equal ability as a premise worth trying out in physical education classes, an experiment to find a way to measure motor ability in college women was begun at the Iowa State Teachers College.

THE PROBLEM

The problem then became that of finding a method which would measure relatively accurately the present status of motor ability in college women for purposes of classification, for improvement of teaching, and for greater fairness in competition in the class and intramural games.

PROCEDURE

Criteria were set up for evaluating the test following the lead of experimenters in the field of testing in physical education for men, and in the field of general aptitude testing. In order that a test may be a satisfactory instrument by which to measure motor ability it must possess certain characteristics of good tests. It must have a high degree of objectivity. It must be reliable. The test must be economical to administer if it is to be practical. The test should yield scores which the administrator and teacher can use toward the realization of the aims and objectives of education. The test must be valid and should yield norms.

It was necessary to set up criteria which would serve as measuring rods against which to evaluate the test. Five criteria were used:

¹ From unpublished material, University of Wisconsin class lecture.

1. The comparison of composite scores (the individual's average score in all items) with the individual's actual score on each item.
2. The comparison of athlete and non-athlete scores.
3. The comparison between teacher judgment and scores.
4. The comparison of actual scores made by freshmen women and those made by junior and senior women who were majoring in physical education.
5. The comparison of team and non-team success.

The literature in the field of physical education was analyzed in an endeavor to determine which activities, in the opinions of experts, were deemed fundamental parts of motor ability (defined in this study as the ability to get around in situations demanding the use of the big muscles—the ability to shift the body from one place to another). Following this analysis, a large number of activities was selected which contained in part or in whole the fundamentals of motor activity. Twenty-two items were chosen for the preliminary trials. (One item dealing with baseball skills was split into two phases included in the total of 22.)

The preliminary items included picking up bean bags and putting them in a basket placed head high, picking up weighted sand bags and placing in the basket, turning one somersault and running ten yards, turing two somersaults consecutively, lying down and rolling under a bar, lying down and rolling over and coming to a stand, running and making a 360° turn in a circle, running making the 360° turn and progressing on between barriers, running ten yards, running twenty yards, climbing a perpendicular ladder, climbing over a box, climbing over high parallel bars, running high jump, dodge tests (Alden and Cozens'), walking a balance beam, running up and down a series of steps, throwing a baseball at a target, running and throwing a basketball over a rope.

Trials were made to check each item for objectivity of directions and setup, and for reliability of the halves of the test, Batteries I and II. Seven items were eliminated as unreliable, unsafe, or administratively inexpedient after the trial tests. Fifteen items remained. These items were administered to 181 women. The data thus secured were analyzed for validity and for possible elimination of all of those items which seemed to be measuring the same element as shown by relatively high intercorrelations, as well as the elimination of all of those items which showed a relatively low correlation with the composite score of fifteen items and were therefore contributing little to the total test.

The analysis of the data in terms of intercorrelations resulted in a residuum of seven items. The composite of the seven items correlated with the composite of the fifteen to the extent of $.92 \pm .008$, thus giving relatively the same picture of the individual as the longer test. The seven items were then set up as a single consecutive unit to be administered as a single item rather than as a series of isolated events. It is at this point that this test departs from the beaten path in test construction in the field of physical education. The test is now composed of these

items: (1) Alden dodge test, (2) roll over on mat, (3) run and climb over box, (4) run, turn in circle and continue between barriers, (5) climb ladder, (6) throw ball, catch it, and (7) run twenty yards.

The single unit correlated with the fifteen-item composite to the extent of $.81 \pm .03$. This unit was given to 437 women. The procedure used with the test in this form was that followed in the preliminary trials—a check for objectivity, reliability, and validity. It was checked also for economy of administration and for the uses which could be made of the scores.

The Alden dodge test as designed by Florence Alden called for gymnasium benches.² In an effort to make the test as economical as possible from the point of view of the availability of equipment, it was decided to try using ordinary folding chairs in place of the benches. A correlation of $.84 \pm .04$ between sets of scores made on both aspects of this situation showed a degree of similarity sufficiently high to warrant using the more common folding chair.

SUMMARY*

Validity.—The test is valid to the extent of the following findings:

1. A battery of seven selected items measures relatively the same quality as that measured by the fifteen items as shown by a correlation of $.92 \pm .008$ between the average scores of the fifteen and the seven items. Furthermore, a correlation of $.81 \pm .03$ shows a sufficiently high degree of agreement between fifteen items and a test composed of seven items run together as one consecutive unit.

2. That the test has the capacity to differentiate between groups is shown in a critical ratio of 5.41 between the mean scores of athletes and non-athletes.

3. The test is practically as reliable a method of grouping students as the present methods of teacher judgment as shown in correlations (contingency) of .62 and .58 between teacher judgment and test scores. The test has the added advantage of offering a method of comparatively accurate grouping on a five-point scale at the end of a few minutes.

4. Teams (in baseball, volleyball, tennis, hockey, and soccer) chosen on the basis of superior scores in the motor ability test won over teams chosen on the basis of inferior scores. The superiors won over the inferiors in ten trial tests out of twelve. Basketball teams divided into three categories from superior to inferior finished a round robin tournament with the superior group winning 83 per cent, the middle group 50 per cent, and the inferior group none of the games played.

5. A critical ratio of 8.34 was obtained between the mean scores of junior and senior women majoring in physical education and the mean scores of freshman women.

² F. D. Alden, M. O. Horton, and G. M. Caldwell, "A Motor Ability Test for University Women," *RESEARCH QUARTERLY*, III: 1 (March, 1932).

* Further statistical analysis of the test may be found in the author's unpublished thesis at New York University, (1936).

Reliability and objectivity.—In terms of the coefficients of correlation of reliability and objectivity, the test measures up to relatively high standards. Two different examiners secured a coefficient of correlation of $.91 \pm .01$ between two sets of data secured on the same girls on different days. A reliability coefficient of $.85 \pm .04$ was secured by a repetition of the test on successive days by the same examiner, demonstrating the comparative accuracy with which the test measures whatever it is measuring.

Economy.—Thirty-five women can be tested in about forty minutes. (The mean time for the test (437 cases) is 49.01 seconds ± 6.02 .) The equipment used is that commonly found in the average college gymnasium. The arrangement of the equipment has been based upon the use of the average gymnasium floor suitable for basketball. After the setup has been marked on the floor with white chalk paint or adhesive guides, the equipment can be pushed into place in five or ten minutes. One examiner with two class assistants can administer the test. One assistant to hold the ball at one point in the sequence is essential. Time is saved by having another assistant act as recorder of the scores as read by the examiner.

Use.—The test has proved a good device for grouping classes for drill in fundamental skills in hockey, soccer, baseball, and basketball. It has tended to increase interests and satisfactions in classes for the general teachers college student who is in training for classroom teaching, by allowing those who are less skillful to work in one group, while the very skillful work by themselves. A measure of self-confidence comes to those who have not had the advantages of others and are therefore less skillful in handling their bodies. Class tournaments in hockey, soccer, and basketball have had added impetus where the teams have been balanced as nearly as possible, using the scores made in the motor ability test as basis. Scores in competitive matches for the season have been nearly equal.

CONCLUSIONS

On the basis of the data secured, the following conclusions were reached:

1. The fundamental elements of motor activity as analyzed by experts are running, jumping, getting up from the floor (equilibrium), getting over obstacles, dodging, and hand-eye coordinations.
2. The seven items chosen to compose the test were best for giving a picture of the present status of the motor ability of the entering college girl in so far as this study has gone.
3. Within the limits of this study, age, height, and weight have practically no significant effect upon the ability to score well in the test; i.e., no one age or type of body build affects the scores made in any significant amount. (The age range was sixteen to thirty years; weight

range, ninety to about two hundred pounds; and height range, fifty-nine to sixty-nine inches).

4. Inasmuch as the test of static strength as measured by the hand dynamometer showed only slight relationship to the individual items used in the motor ability test, it is concluded that the ability to do well in the test indicates a sufficient amount of strength to meet the demands of such motor situations as those set up in this study.

5. The directions for administering the test are sufficiently objective to guarantee a high degree of standardization for the motor ability test.

6. The test is economical both of time and equipment. A class of thirty-five can be tested in forty minutes. The equipment used is standard and simple.

7. The test can be used as a means of classifying students into groups for instructional and competitive purposes with a relatively high degree of accuracy as shown by the critical ratios of 5.41 between athletes and non-athletes, and 8.34 between junior and senior physical education major students and the entering freshmen.

8. Scores have been obtained on 2195 women so that norms for this institution can be used. The cases include students from the different size high schools in the state, from public and private schools, from rural and urban districts, from various economic strata. Data from the University of California at Los Angeles show the same general trend with reference to means, critical ratio between upperclass majors and entering freshmen, and the correlations between height, weight, and age. When more data from other parts of the country have been obtained it should be possible to establish norms for this test.

SUGGESTIONS FOR FURTHER RESEARCH

A continuation of this study might well include some investigations along the following lines:

1. Administration of the test in widely differentiated parts of the United States.

2. Administration of the test on the elementary and secondary school levels. (A project is now under way on the elementary level).

3. Administration of the test to college men.

4. More comprehensive experimentation with use of the test as a classifying tool in such activities as tennis, archery, and golf, as well as in the field of rhythmic education.

5. An analysis of the outcomes of classes sectioned by means of the test.

6. Correlations with capacity and other physiological tests.

7. Use of the test as a part of a battery of tests for admission into professional work in physical education.

BOOK REVIEWS

PHYSICAL DIAGNOSIS. Ralph H. Major, M.D. (Philadelphia and London: W. B. Saunders Company, 1937), 457 pages, 427 illustrations. Cloth, \$5.00 net.

Dr. Major says of this book, designed for the assistance of the medical student in learning physical diagnosis, that he has drawn from many standard texts and sources as well as from his fifteen years of teaching physical diagnosis to medical students. As a text it is somewhat less elaborate than many. This is surely an advantage in a first text, as compared to the elaborate reference books of individual systems and specialties. To obtain a clear underlying notion of systems and procedures seems entirely essential to a workable and healthy command of any subject undertaken. Succinct summarizations at chapter ends serve for review and for fixing in mind large important topics for further elaboration.

There are nearly as many illustrations as pages. Photographs are good, but are along the usual lines of medical texts. The diagrams, rather, are the distinctive contributions of the author and are a real help in clarifying our learning.

The general distribution of headings is not unusual nor very different from some of the illustrious predecessors among physical diagnosis, but the author's moderate amplification of "The Examination of the Nervous System" finds a very suitable place for itself in the text. This chapter contains some of the very enlightening diagrams, particularly that of lesions affecting reflexes, on page 402. A short chapter of "History Taking and Recording" seems a very helpful addition to a text of physical diagnosis and aids in giving the generally well rounded presentation that

deserves such favorable comment.

Type and format are pleasant. The print is clear, and the paper of good texture and suited to scholarly thumbing and wear, though rather highly glazed for eye comfort. One tiny numbered figure (page 97), was about the only error the reviewer could detect.

Sincerity and practicality are qualities this book possesses. The author admires the writings of the older masters and quotes interesting words of his teacher, Friedrich v. Müller: "We must not explore the chest by percussing our ideas into it; we must rather give our attention to listening to what comes out" In discussing blood pressure measurements, Dr. Major suggests that taking the systolic both by auscultation and palpation is revealing. In case of contradiction the palpatory result is the lower, and the more reliable. The author has indeed summarized many practical points which his experience has shown him to be of particular value and interest to the student—graduated or not yet graduated.

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THE THEORY AND PRACTICE OF FENCING.
Julio Martinez Castello. (New York: Charles Scribner's Sons, 1933), 269 pages. \$2.50.

High praise is due the author of this book for writing so clearly and intelligently on a subject that needed just such an exposition. There has seemed to be a reluctance or a disinclination on the part of fencing masters to present their subject in simple written form, and so fencing has perhaps suffered somewhat in comparison with

other sports which have a flourishing literature.

This book can be read, understood, and enjoyed by all groups of people—advanced fencers or beginning fencers, and even spectators. Many non-fencers will welcome this opportunity to learn what to watch for in a bout. Fencers will find the complete and clear explanations of the various movements most helpful.

Teachers of fencing may well profit by the material presented. Many good exercises are given with clear explanations and pictures. The illustrations throughout are particularly good. They are clear, simple, and appropriate. Gabriel Mayorga has done an excellent piece of work in this respect.

Special mention should be made of several excellent features of the book. The progressive illustrations in the "Practice Exercise" chapters are very fine graphic presentations of fencing movements. "The Short History of Fencing" is very useful for beginners. The chapter on "Analysis of the Foil Bout" is outstanding—its worth and value increase as one's experience and practice in fencing increase. The discussion of sabre and épée bouts is very well and simply handled.

My one regret was that Castello translated into English all the traditional French terms and expressions of this sport. When the language of a sport has practically an international usage, it seems to me desirable to retain that language rather than to translate it.

It seems to me doubtful whether fencing can or should be learned by book only, without an instructor, as was intimated in the text. The book can, however, be a very real aid in clarifying and practicing the instructions given by a fencing teacher.

I believe that this book deserves a wide circulation. It is an excellent piece of work and an outstanding contribution to fencing.

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SKIING—A HANDBOOK FOR TEACHERS.

Ingrid Holm. (Troy, N. Y.: Russell Sage College, 1936), 114 pages.

This compact little volume, written for teachers to serve as a guide for those contemplating the projection of skiing into the school and college physical education program, is a worthy contribution, written very enthusiastically, with a unique approach. It is progressively arranged, well organized, indexed, and contented.

For those of us who have followed current winter sports trends to the end that we feel that the increased desire on the part of most people for out-of-doors, away-from-home, seasonal activities has one of its answers in the tremendous nation-wide interest in skiing, this new little ski text is particularly welcome. It should be a very important factor in helping skiing to become an integral part in participatory, carry-over-value, recreational-physical education.

Mrs. Holm emphasizes the recreational values of skiing, and calls attention to the new emphasis which is dominating this relatively new activity. Ski-jumping and straight downhill running are being rapidly supplanted in a remarkable degree by a downhill technique replete with turns, skids, and stops, that are within the range of ability of all skiers from eight to eighty.

We find it a bit difficult to agree with all of her findings concerning the relative values of competitive and the so-called recreational skiing. While this book is designed for reference among the countless skiing enthusiasts who will pursue the sport primarily for recreational purposes and not for competition, we should not lose sight of the fact that competitive skiing is our research department, has its place in the program, and has made an important contribution to the development of skiing in this country.

The comparison that Mrs. Holm points out concerning the thousands who drive automobiles, and the few who take the risk of racing in them, is well-done. However, the placing of Slalom

skiing in the category of a dangerous activity may bother some of us who feel that Slalom running, with its emphasis on controlled skiing, is indeed one of the means we have of providing the safest approach to skiing.

Park Carpenter, Editor of the *Ski Bulletin*, the official organ of the National Ski Association of America, has admirably reviewed this book, and has paid such a splendid tribute that we feel we must repeat one or two of his statements here. Mr. Carpenter (himself the author of an authoritative brochure on pre-seasonal instruction for recreational skiing) comments very favorably on the "chapter on 'dry course' exercises, miscellaneous pedagogical advice, and seven three-hour programs, designed as a seven day course of instruction."

Mrs. Holm's Scandinavian emphasis on level and uphill skiing may not fit as well with the American youth, and it should be kept in mind that the continued popularity of the sport of skiing will depend upon the new challenges, new demands, new adaptations, new strategies or new techniques that it presents. However, we are so in accord with some of the very essential recommendations Mrs. Holm makes that we can forgive some of the seven-day grind.

We like the author's attention to ski minutiae, as, for example, we are sure that ski gymnastics should, for the most part, be done with the ski poles in hand. We miss paraffin in the wax chapter and wonder if waxing can't be made interesting.

Mr. Carpenter states that "it is most unfortunate that in writing this handbook, Mrs. Holm has not used the commonly accepted English ski vocabulary."

The book is illustrated by a series of stick figures, by Emily Russell Andrews, illustrating various positions and movements. These are very well done, and to agree again with Mr. Carpenter, "These drawings are by all odds the best thing of the sort we have seen illustrating works of ski instruction, and are themselves worth the price of the book."

The chapter on advice for ski teachers, and the list of common faults after each technique should be invaluable, particularly to the new ski instructor.

Mrs. Holm's handbook is a distinct contribution to the literature of skiing. The well-balanced physical education program of the future will unquestionably include skiing. Compiled for school use, this book should help considerably in fulfilling the hope the author has, namely, that "the teacher-training institutions of the country will see the need and place ski instruction in their programs for the students."

HAROLD GORE

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RESIDUAL NEURO-MUSCULAR HYPERTENSION: IMPLICATIONS FOR EDUCATION. Josephine Rathbone, Ph.D. (New York: Columbia University, 1936). 220 pages.

"All manner of physical and psychological ills besetting the individual, as well as various dangers threatening society in general are blamed on 'fatigue'; and authorities and teachers in every field of human endeavor are citing the nervous symptoms which accompany that 'fatigue.' The subject is more than academic. Men of action as well as of theory are concerned with the many problems involved and even the man on the street is led to consider the consequences of 'over-exertion,' 'excessive tension,' and 'undue stimulation'—terms which he has gathered from his reading in popular sources"—so states Dr. Rathbone in her presentation of the problem of *Residual Neuro-Muscular Hypertension: Implications for Education*.

The problem of fatigue in its early stages and the means of preventing, as well as alleviating its consequences, should be given thoughtful consideration by all teachers and especially those interested in physical and health education. While it may be best approached by informing the masses through the work of the schools, yet adults also

should have instruction in ways of counteracting the forces predisposing toward physical and psychological breakdown.

There has been a growing interest in fatigue both as a social and medical problem in recent years. Sociologists have realized that promoting better social conditions is the surest way to promote rest and contentment and to eliminate tension and fatigue. Industrialists realize that undue fatigue is the worst form of waste and have made an effort to eliminate all unnecessary fatigue. Physiologists, psychologists, psychiatrists, clinicians—all have made a study of this problem from their own particular standpoint and conclude that fatigue is a strong factor in promoting neuro-muscular hypertension in varying degrees.

As a background for this dissertation an exhaustive study of hypertension of both nerve and muscle tissue has been made. The literature on the subject has been reviewed and the emphasis has been most generally upon the relationship of neuro-muscular hypertension to neuroses and psychoses, to intellectual endeavor, to insomnia, to arterial or vascular hypertension, and to neurologic conditions. This material has been supplemented by many and varied examples taken from clinical records.

In summarizing the causes of residual neuro-muscular hypertension, the author then concludes the following:

1. A person's general appearance gives no accurate information concerning the degree of residual tension in his muscles.

2. Any posturing of a loosely articulated structure like the human animal will demand muscular tonus; any persistent static position held actively will result in residual tonic contraction.

3. Residual neuro-muscular hypertension is no respecter of body type, as revealed by height-weight relationships. The fat man as well as the thin one may be tense.

4. As a means to better metabolism, pulmonary ventilation must be aided; and any natural activity in childhood or

adult years which will increase the flexibility of the chest is to be encouraged.

5. As far as endocrine functioning is concerned, evidence only on the effect of parathyroid dysfunction to calcium availability is offered, calcium being essential for proper relaxation of muscle.

6. Conditions in the internal organs may be said to have an effect upon the tension of skeletal muscle; while hypertension in skeletal muscle causes sufficient reflex spasm in smooth muscle to result in marked discomfort and dysfunction.

7. No conclusions could be drawn as to effect of infection or drugs upon muscular tension.

8. Pain has been shown to be a concomitant of extreme neuro-muscular tension.

9. Emotional strain has been acknowledged to be an important cause of neuro-muscular hypertension and evidence presented to show that when an individual lacks security of any kind he will reveal symptoms of residual tenseness.

10. Over-activity from whatever origin has been shown to be the most common cause of residual neuro-muscular hypertension in the cases analyzed.

The implications for education from this study may be grouped as follows:

1. School health inspection should be of such a nature that a thorough and satisfying examination may be made of each pupil and any ill founded fears of defects or apprehensions be allayed.

2. School health service should offer facilities for proper guidance in matters of health programs of activity, and rest, and in so far as possible control general environmental conditions to relieve such tension as might arise therefrom.

3. Schools should offer instruction in healthful living, emphasis being placed on rest and sleep habits as early as kindergarten, on attitudes as early as the sixth grade, and on knowledge in high school and college years.

4. Systems of education which thrust decisions too rapidly on children demand of them a type of mental and emotional struggle which is often be-

yond their powers. "School sickness" produced by "pressure" in the classroom, irritability, restlessness, anxiety and a highly emotional state are synonymous with residual neuro-muscular hypertension. Children should be carefully guided in amount of stimulation desirable for their best interests, trained in appreciation of the beautiful, and have the opportunity to establish a sense of security in their social realm.

5. A calm teacher encourages a calmness in his pupils, and a fretful, irritable, discontented teacher keeps his charges stirred up and hypertense.

6. Besides offering diversions and rhythmic big-muscle activities to offset the tedium and static contractions of the academic program, physical education should afford training in the release of tension in those specific muscles where it can be recognized and to cultivate repose in such areas where tension is found.

7. Provided the schedule has supplied academic stimulation and vigorous physical education, the child and youth should not be kept stirred up by participation constantly in action projects. Only when the school schedule is stultifying is there need for stimulating extra-curricular activities. Both the parents and school are offenders against the child's well-being in this situation.

8. As regards healthful living, parents have a greater responsibility than the school. Correction of physical defects, medical attention, regulation of environmental factors of food, clothing, and sleep are primarily the responsibility of parents. The training the child receives in the home has much to do with his happiness, his emotional poise, and his power to adjust himself to his environment.

9. As one grows older one should learn definitely to observe one's own symptoms of residual tension and to recognize the signs of his deviations from the optimum.

10. If teachers themselves realized the values of saving muscular effort, they would refrain from doing things that lead invariably to residual neuro-

muscular hypertension and ultimate inefficiency and discomfort. Teachers should be relieved from strains and worries that make them tense and should have the same protection and regard as any other group of workers from loss of income at periods of depression and economic readjustment.

The comprehensiveness and practicality of this material and suggestions offered could never be the result of anything but long practical experience in the field. The exhaustive study that the author has made both in the literature and conclusions drawn from her own personal experience make this a valuable contribution to the field of physical education.

CLARA I. RAUSCH

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HARMONIOUS DEVELOPMENT OF WOMEN'S BODIES. Alice Bloch. (New York: Emerson Books, 1936), 136 pages. \$3.00.

This book was translated from its original German text by Mathias H. Macherey, Assistant Supervisor of Physical Education, Newark, New Jersey. It has received high commendation from the medical profession, from biologists, and physical education directors. Alice Bloch is Director of the Orthopedic Gymnastic Institute in Stuttgart, Germany.

She declares, in a preface, that "no definite system of physical education can be forced upon all," because "human beings differ so vastly." She further states that "a healthy body and an unaffected, sound mind have been made possible to our people through physical education, sport, and gymnastics."

The first three chapters discuss, in turn, "the effects of gymnastics upon our body and its internal organs," "orthopedic derangements," and "posture and breathing."

With the fourth chapter the author begins to give detailed instructions for development of the body beautiful. The directions are made extremely clear

and easy to follow by the use of actual photographs—140 in all—taken at Miss Bloch's institute, many of them having been posed by her students out of doors.

This book is unique in that it not only describes and illustrates the steps to be taken toward the building of a good physique, but it also tells, in a most interesting style, just what each exercise actually does for the exerciser's health, when carried out correctly, and why incorrect methods are not advisable.

Nor is the health angle alone given consideration. Appearance is emphasized. How to sit, stand, and walk with ease and grace, how to avoid and overcome the appearance of fatigue, and how to relax properly are subjects discussed in detail.

The teacher talks to teachers. "Gymnastic practice must be individual. This assumes certain knowledge of the human body and its structure, and an ability to diagnose conditions of health and illness. To teach gymnastics without possessing this knowledge would indeed be criminal."

She also addresses herself to the pupils: "Begin with the simplest exercises. . . . When symptoms of fatigue make their appearance, change to other forms of easy exercises. . . . Never forget the value of fresh air."

This book will be of great value to instructors. The author makes it clear that gymnastic exercises are always best taken under competent supervision.

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CAN DELINQUENCY BE MEASURED? Dr. Sophie M. Robison. (New York: Columbia University Press).

Can Delinquency Be Measured? is the result of a several years' study by the Research Bureau of the Welfare Council of New York City aided by Columbia University.

According to Dr. Robison, who is in charge of the Division of Neighborhood Statistics of the Council, the problem of juvenile delinquency boils down to the

question of how to take care of the surplus energies of children. She concludes that the official records concerning juvenile delinquency do not always show the true picture.

In her studies she found very little "inherent delinquency" and is inclined to doubt its existence. She maintains that the reason there is far less delinquency in rural and suburban communities is that the excess energies of youth in these areas find outlets which the community tolerates, whereas in the city the same energies and outlets will frequently land the children in the courts.

Dr. Robison points out that it is almost impossible for a rural child to be a delinquent, in the sense of the term which the city accepts.

"To say that children are really more delinquent in one environment than another seems superficial," Dr. Robinson comments. "In the neighborhood of railroad yards or similar places more of them are arrested. The same type of play instinct in another type of community would be considered all right." In this connection, Dr. Robison points out that "in communities where the parents are influential and well known, certain things are considered pranks which in the heart of Manhattan would be considered criminal offenses and treated as such."

In New York City, in proportion to the population there are more Italian-Catholic delinquents than any others, and more delinquents among Catholic children than among Protestants and Jews. Even though the figures might tend to "show" otherwise, Dr. Robison does not believe delinquency has anything to do with either religion or nationality.

Dr. Robison is reluctant to admit that girls are less delinquent than boys, even though almost eight times as many boys reach the juvenile courts. Parents and others are more loath to send girls to court than boys, and many of the boys' activities are rated as delinquent because they are a nuisance to business men, property owners, and adults.

Although there is more delinquency among children of the poor, Dr. Robison does not feel that poverty is the sole cause. There are many other contributing factors to be taken into account, she maintains.

The general conclusion of Dr. Robison is that children are no worse than they always were. The solution to the current problem of delinquency seems to rest with society. She suggests that society must decide whether or not the delinquent child is to be punished and removed from community life so that he is no longer a menace, or be adjusted to community life by studying him as an individual who is the product of his environment.

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TEACHING NUTRITION TO BOYS AND GIRLS. Mary Swartz Rose, Ph.D. (New York: The Macmillan Company, 1934), Revised ed., 198 pages, 32 plates.

This book, a synthesis of experience shared by pupils and teachers, is a comprehensive guide for educators who aim to promote health through intelligent use of food.

The Contents comprises four units entitled:

I. Food Makes a Difference.

II. A. Taking Milk Apart. B. We Need Calories Plus Calcium Plus Vitamin D.

III. Finding Vitamin A. (Continuation of Taking Milk Apart.)

IV. A. Finding Vitamin C. B. Learning The Right Use of Sugar.

Four sets of outlines, each having ten lessons, suggested activities, references, and tests, are printed with graded scientific facts, feasible for each unit. The main functions of one dietary essential is established before another is introduced. Every lesson covers five parts: Subject, Objective, Procedure, Illustrative Material, and Assignment.

Tests include multiple choice, completion, true false, and matching. One of every type is arranged with items based on each of the four units.

The practicability of the lessons has been tested since 1925 by the author and graduate students in Teacher's College, Columbia University, as well as by instructors in regular service who have used the book for several years. It is recommended without condition.

As the material was presented, pupils in the intermediate grades learned how to meet their own body needs. Through personal problems, and experiments with animals, they also grew to enjoy the most important foods in a natural state, or so simply prepared that little labor or technical skill is required. Desirable emotional drives and habits were developed; facts functioned in everyday experiences. Boys and girls acquired adequate diets at very low cost, and realized that scientific recommendations are vital.

The Appendix is extremely valuable with tables and information about the White Rat: Methods of Obtaining Rats; Number and Age Needed; Signs of Health; A Normal Diet for Growth of Rats; The Normal Rate of Growth; Cages; Daily Care; Protection from Cold; Weighing; Cleaning Cages; Care in Handling Animals, and Techniques for Classroom Management.

The author proved her points with modern principles of education and pertinent knowledge of food. All statements are clear and the presentation is interesting.

Years of devotion to the topic has given Dr. Rose deep and kindly insight into the ways of children, also knowledge to meet their problems.

School days would be happier if all teachers knew this book. It is free from dogma, is compact, and possesses mellowness of experience.

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